

# REPORT

ON THE

## COTTON PRODUCTION OF THE STATE OF ARKANSAS,

WITH A DISCUSSION OF

THE GENERAL AGRICULTURAL FEATURES OF THE STATE.

BY

R. H. LOUGHRIDGE, PH. D.,  
SPECIAL AGENT TENTH CENSUS.

# TABLE OF CONTENTS.

LETTERS OF TRANSMITTAL.....	Page. v
TABULATED RESULTS OF THE ENUMERATION .....	1
TABLE I.—Area, Population, Tilled Land, and Cotton Production .....	3
TABLE II.—Acreage and Production of Leading Crops .....	5
PART I.	
PHYSICO-GEOGRAPHICAL AND AGRICULTURAL FEATURES OF THE STATE OF ARKANSAS .....	9
Surface Features.....	9
Climate .....	10
Drainage .....	10
Geology .....	11
Agricultural Features .....	11
The Prairies of the State .....	12
Statistics of Population .....	12
Lands under Cultivation .....	13
Alluvial Lands.....	13
The Mississippi and Saint Francis Region .....	13
Arkansas River Bottom Lands .....	15
Lands of White River and its Tributaries.....	17
Black River Lands .....	17
Cache River Lands .....	17
Bottom Lands of the Onachita River and its Tributaries.....	18
Red River Bottom Lands .....	19
Crowley's Ridge Region .....	20
The Gray Silt Prairies of the East .....	23
Yellow Loam, or Oak, Hickory, and Short-leaf Pine Uplands.....	24
Red Lands .....	25
Gray Sandy Lands .....	26
Pine Flats, Glady Lands, and Oak Flats.....	26
Prairies .....	27
Black Prairies of the Southwest.....	27
The Central Red Loam, or Shale and Sandstone Region.....	28
Gray and Red Loam Timbered Region.....	29
Country south of the Arkansas River .....	29
Country north of the Arkansas River .....	31
Western and Central Red-Loam Prairie Region .....	32
Northwestern Red-Loam Prairies.....	33
Metamorphic Region.....	34
Northern Barrens and Hills Region .....	35
Sandy and Cherty Lands of the Sandstone Region .....	35
Cherty Magnesian Limestone Hills, Barrens, and Prairies.....	37
GENERAL REMARKS ON COTTON PRODUCTION .....	38
Statistical Results of the Tenth Census .....	39
Acreage .....	39
Percentage of Tilled Lands in Cotton .....	39
Production .....	39
Product per Acre.....	39
Counties.....	40
Regional Comparisons.....	40
Table showing Population and Cotton Production in each Agricultural Region.....	40
Table showing "Banner Counties" as Regards Production and Product per Acre in each Region .....	40
Transportation Facilities .....	41
Table of Analyses of Soils and Subsoils.....	42

## TABLE OF CONTENTS.

## PART II.

	Page.
AGRICULTURAL DESCRIPTIONS OF THE COUNTIES OF ARKANSAS.....	49
Mississippi Alluvial Region.....	49
Crowley's Ridge Region.....	52
Gray Silt Prairies.....	59
Yellow-Loam Region.....	61
Red-Loam Region.....	74
Northern Barrens and Hills Region.....	88

## PART III.

CULTURAL AND ECONOMIC DETAILS OF COTTON PRODUCTION.....	95
Reference Table of Names and Addresses of Correspondents.....	96
Summary of Answers to Schedule Questions.....	97
Tillage, Improvements, etc.....	97
Planting and Cultivation of Cotton.....	99
Ginning, Baling, and Shipping.....	101
Diseases, Insect Enemies, etc.....	102
Labor and System of Farming.....	104

## MAPS AND ILLUSTRATIONS.

MAP SHOWING AGRICULTURAL REGIONS.....	9
MAP SHOWING RELATIVE ACREAGE OF COTTON AND TOTAL ACREAGE.....	38
SECTIONS ACROSS THE MISSISSIPPI BOTTOM.....	13

## LETTERS OF TRANSMITTAL.

---

BERKELEY, CALIFORNIA, *July 1, 1882.*

The SUPERINTENDENT OF CENSUS.

DEAR SIR: I transmit herewith a report on the cotton production and agricultural features of the state of Arkansas, by Dr. R. H. Loughridge, special agent.

This report is written on the general plan heretofore outlined by me and adopted in its essential features by the special agents in charge of the other cotton states. It differs from all the other reports in that it is not based upon any personal observation within the state, but has been compiled from all available sources of information, including, of course, the answers to the schedule questions on cotton culture sent out by this office. It is a matter of regret that these answers in the present instance have been but very few in number. For the rest, the omission of any field exploration of the state seemed to be justified by the existence of the valuable and elaborate reports of the survey of Arkansas by Dr. D. D. Owen and his assistants, in which not only the geological but also the agricultural features were closely observed and recorded. Dr. Owen was foremost among those who believed that agriculture should receive at least as much attention from state surveys as is usually, and too often almost exclusively, given to those features relating to mining and other industries; and, had he lived, an agricultural description of Arkansas substantially like the one herewith transmitted would probably have been issued by himself. His early death left a large amount of material unelaborated, and, although published, its form has stood in the way of its usefulness and of the recognition of the practical value of the work done. That this has been so cannot be surprising, in view of the amount of labor it has cost us to eliminate, segregate, and arrange the materials scattered through the volumes of the Arkansas reports into one connected and systematic whole. The same labor would have had to be performed to a greater or less extent by any one desiring to utilize these data for the understanding or description of any particular portion of the state; and that the task has been thought too hard is obvious from the very meager descriptions, filled up with vague generalities, that have been issued at various times by immigration societies, railroad companies, and other sources, as a guide to immigrants. The present case is but one of many similar ones, in which the reports of surveys, both state and national, are practically useless to the agricultural immigrant, because, instead of presenting to him an intelligible and well-digested summary of the agricultural features, he is usually left to the weary search for scattered data through ponderous volumes, the result being that he is almost as much thrown upon the reports and representations of interested parties as though no effort had been made by the government to make known the resources of the country.

The numerous soil analyses made in connection with the Arkansas survey by Dr. Robert Peter acquire double interest in the grouping now given them under the respective regional heads, and supply many striking proofs of the ability of soil analysis to furnish such definite indications of the general quality, peculiarities, and cheapest mode of improvement of soils, as will, when properly interpreted, serve as a sound basis for practical agriculture. The record is, however, defective as regards the specific statement of the depths to which the soil samples were taken, and also in that the determinations of the hygroscopic moisture were not made under definite conditions, but from "air-dried" material.

Considering the circumstances under which the present report has been written, it is quite probable that it is not in all respects as complete and accurate as might have been desirable, or as may be the case with those on

other states in which personal researches have served as the basis for the description. To those who may note such imperfections, it can only be said that Dr. Loughridge has fully and faithfully utilized all available sources of information, and, with myself, can but regret that they have not been more complete.

Very respectfully,

EUG. W. HILGARD,  
*Chief Special Agent in charge of Cotton Production.*

BERKELEY, CALIFORNIA, May 31, 1882.

Professor E. W. HILGARD,  
*Special Agent in charge of Cotton Production.*

DEAR SIR: I have the honor to transmit herewith the report on cotton production in the state of Arkansas, embracing also, in accordance with your instructions, a description of its agricultural and such other features as affect the culture of this, one of the chief crops of the state.

The report embraces the following general divisions, preceded by statistical tables of population, cotton production, and the acreage and yield of other chief crops.

PART I. The general description of the state and its agricultural regions.

PART II. Short descriptions of counties, arranged according to regions, and embracing also abstracts of schedule reports.

PART III. Details of cotton culture in the counties of the state, as compiled briefly from the answered schedules of correspondents.

In preparing this report I have been compelled to draw almost entirely upon the publications of the state geological survey by Dr. D. D. Owen, and upon a pamphlet by James P. Henry, entitled "Resources of the state of Arkansas", and upon such other information as I could gather by correspondents and the answered question schedules on cotton culture sent out from this office to parties in each county. I very much regret that I had not the advantage of a personal visit to the several sections of the state, which would doubtless have enabled me to present its agricultural resources in a much more clear and satisfactory manner. I have, however, found Dr. Owen's report invaluable, for, although not generalized, being rather, for the most part, a description of some of the counties, it embraces a brief mention of some of the agricultural features of each county passed over by the survey corps. From this scattered material, incomplete in many particulars (probably because of the death of Dr. Owen), I have been enabled to arrange and describe the several agricultural regions with sufficient clearness and accuracy, I hope, to give any one a correct idea of the state.

The soil analyses found throughout the report are also from the work alluded to, and were made by Dr. Robert Peter, of Kentucky. The methods of analysis used were very much the same as have since been adopted by yourself, thus rendering comparable the chemical composition of the soils of this and other states. The map which accompanies the report does not pretend to give more than a general outline of the chief regions, as it was found impossible under the circumstances to obtain the details of the areas embraced in each. The colors used in designating the regions are, as far as possible, made to agree with those of similar regions in the other states under your charge, and also with the general map. The outlines of the alluvial region of the Mississippi river are from the report of Humphreys and Abbott, while those of the Arkansas, below Little Rock, were given by the correspondent from Prairie county.

Very respectfully,

R. H. LOUGHRIDGE.

---

# TABULATED RESULTS OF THE ENUMERATION.

---

TABLE I.—AREA, POPULATION, TILLED LAND, AND COTTON PRODUCTION.

TABLE II.—ACREAGE AND PRODUCTION OF LEADING CROPS.

# TABULATED RESULTS OF THE ENUMERATION.

3

TABLE I.—AREA, POPULATION, TILLED LAND, AND COTTON PRODUCTION.

Counties.	Land area.	POPULATION.						TILLED LAND.		COTTON PRODUCTION.							Cotton acreage per square mile.	Bales per square mile.
		Total.	Male.	Female.	White.	Color'd.	Average per square mile.	Acres.	Per cent. of area.	Per cent. of tilled lands devoted to cotton.	Acres.	Bales.	Average per acre.					
													Bale.	Seed-cotton.	Lint.			
The State.	Sq. mls.	53,045	302,525	416,279	386,246	501,531	210,904	15.1	3,431,900	10.1	30.4	1,042,976	608,256	0.58	870	290	10.7	11.5
ALLUVIAL REGION.																		
Mississippi bottom lands.																		
Chicot	840	10,117	5,321	4,796	1,563	8,554	12.0	38,658	7.2	69.7	26,941	25,338	0.94	1,410	470	32.1	30.2	
Desha	730	8,073	4,877	4,096	2,452	6,521	12.3	42,642	9.1	49.6	21,159	18,103	0.80	1,290	430	29.0	24.8	
Crittenden	660	9,415	5,034	4,381	1,899	7,516	14.3	43,046	10.3	55.9	24,413	10,039	0.66	990	330	37.0	24.3	
Mississippi	810	7,332	4,006	3,326	4,071	2,661	9.1	29,330	5.7	48.5	13,326	10,430	0.78	1,170	390	16.5	12.9	
Total	3,040	35,837	10,238	16,599	10,585	25,252	11.8	154,276	7.9	55.6	85,839	69,910	0.81	1,215	405	28.2	23.0	
Crowley's ridge.																		
Phillips	630	21,262	11,085	10,177	5,444	15,818	33.7	78,916	10.6	54.1	42,654	29,070	0.68	1,020	340	67.7	46.1	
Monroe	600	9,574	5,104	4,470	4,865	5,209	14.5	50,372	11.9	43.7	22,017	14,106	0.64	960	320	33.4	21.4	
Lee	580	13,268	7,121	6,167	4,138	9,150	22.9	61,307	10.5	53.8	33,000	21,147	0.64	960	320	56.9	36.5	
Woodruff	580	8,646	4,503	4,143	4,163	4,483	14.9	37,889	10.2	47.8	18,124	12,311	0.68	1,020	340	31.2	21.2	
Saint Francis	620	8,389	4,518	3,871	4,921	3,468	13.5	35,406	8.9	33.5	11,857	5,966	0.50	750	250	10.1	9.6	
Cross	620	5,050	2,693	2,357	3,261	1,789	8.1	19,225	4.8	39.6	7,607	4,768	0.63	945	315	12.3	7.7	
Poinsett	760	2,192	1,140	1,052	1,902	290	2.9	7,712	1.6	30.8	2,373	1,514	0.64	960	320	3.1	2.0	
Jackson	620	10,877	5,771	5,106	8,113	2,764	17.5	46,483	11.7	46.7	21,718	13,895	0.84	960	320	35.0	22.4	
Lawrence	600	8,782	4,645	4,137	8,315	467	14.6	43,805	11.4	24.6	10,768	6,480	0.60	900	300	17.9	10.8	
Craighead	730	7,037	3,645	3,392	6,770	261	9.6	35,514	7.6	20.4	7,246	4,374	0.60	900	300	9.9	6.0	
Greene	640	7,430	3,944	3,536	7,405	75	11.7	29,109	7.1	23.7	6,886	3,711	0.54	810	270	10.8	5.8	
Clay	580	7,213	3,814	3,399	7,191	22	12.4	26,337	7.1	16.1	4,289	2,307	0.54	810	270	7.3	4.0	
Total	7,620	109,790	57,983	51,807	65,994	43,796	14.4	472,075	9.7	39.9	188,498	119,049	0.63	945	315	24.7	15.7	
GRAY SILT PRAIRIE REGION.																		
Arkansas	1,000	8,038	4,286	3,802	4,971	3,067	8.0	35,128	5.5	35.9	12,611	8,568	0.67	1,005	335	12.6	8.5	
Prairie	710	8,435	4,455	3,980	5,691	2,744	11.9	35,032	7.7	34.6	12,124	6,977	0.58	870	290	17.1	9.8	
Lonoke	760	12,146	6,523	5,623	8,143	4,093	10.0	63,652	13.1	32.9	20,910	11,704	0.50	840	280	27.5	15.4	
Total	2,470	28,619	15,214	13,405	18,805	9,814	11.0	133,812	8.4	34.1	45,645	27,189	0.60	900	300	18.5	11.0	
YELLOW-LOAM REGION.																		
Ashley	950	10,156	5,095	5,061	5,026	5,130	10.7	48,455	8.0	40.4	19,555	11,371	0.58	870	290	20.6	12.0	
Union	1,000	13,419	6,050	6,769	6,985	6,434	13.4	69,472	10.0	43.4	30,136	11,013	0.37	555	185	30.1	11.0	
Columbia	860	14,090	7,078	7,012	8,587	5,593	16.4	80,300	14.6	40.4	32,427	13,039	0.40	600	200	37.7	15.2	
La Fayette	490	5,730	2,931	2,799	2,116	3,014	11.7	27,361	8.7	38.8	10,611	6,339	0.60	900	300	21.7	12.9	
Miller	690	9,919	5,226	4,693	5,324	4,593	14.4	46,038	10.4	41.5	19,111	11,643	0.61	915	305	27.7	16.9	
Little River	530	6,404	3,378	3,026	3,064	3,340	12.1	27,083	8.0	38.3	10,368	7,116	0.69	1,035	345	19.6	13.4	
Sevier	550	6,192	3,170	3,016	5,088	1,104	11.3	25,448	7.2	28.6	7,283	4,075	0.56	840	280	13.2	7.4	
Howard	630	9,917	5,105	4,812	7,409	2,568	15.7	44,812	11.1	27.4	12,259	7,051	0.58	870	290	19.5	11.2	
Hempstead	730	19,015	9,728	9,287	9,593	9,422	26.1	76,537	16.4	35.5	27,142	13,985	0.52	780	260	37.1	19.2	
Nevada	670	12,959	6,665	6,294	9,236	3,723	19.3	70,858	16.5	33.8	23,925	10,520	0.44	660	220	35.7	15.7	
Quachita	780	11,758	5,886	5,872	5,504	6,254	16.1	65,733	14.1	36.3	23,855	8,849	0.37	555	185	32.7	12.1	
Calhoun	610	5,671	2,926	2,745	3,583	2,088	9.3	33,391	8.6	40.1	13,377	5,370	0.40	600	200	21.9	8.8	
Bradley	700	6,285	3,158	3,127	4,075	2,210	9.0	34,068	7.6	35.9	12,221	4,900	0.40	600	200	17.5	7.0	
Draw	840	12,281	6,116	6,115	6,472	5,759	14.6	53,537	10.0	40.7	21,796	9,964	0.46	690	230	25.9	11.9	
Lincoln	540	9,255	4,802	4,453	4,212	5,043	17.1	38,421	11.1	45.6	17,519	11,563	0.66	990	330	32.4	21.4	
Dorsey	600	8,370	4,330	4,040	6,041	2,320	13.9	42,564	11.1	36.3	15,462	6,140	0.40	600	200	25.8	10.2	
Dallas	680	6,505	3,288	3,217	4,299	2,208	9.9	35,505	8.4	40.3	14,306	6,167	0.43	645	215	21.7	9.3	
Clark	950	15,771	8,191	7,580	10,567	5,204	16.6	67,529	11.1	37.2	25,092	13,924	0.55	825	275	26.4	14.7	
Grant	650	6,185	3,211	2,974	5,029	556	9.5	20,844	7.2	32.4	9,680	3,999	0.41	615	205	14.9	6.2	
Jefferson	870	22,386	11,716	10,670	5,331	17,055	25.7	72,141	13.0	63.0	45,426	34,588	0.76	1,140	380	52.2	39.8	
Total	14,250	212,218	108,656	103,562	118,141	94,077	14.9	989,106	10.8	39.6	391,551	201,612	0.51	765	255	27.5	14.1	
RED-LOAM REGION.																		
Pike	620	6,345	3,248	3,097	5,951	894	10.2	26,628	6.7	27.6	7,341	3,787	0.52	780	260	11.8	6.1	
Polk	945	5,857	3,011	2,846	5,792	65	6.2	23,915	3.9	17.8	4,230	2,061	0.49	735	245	4.5	2.2	
Montgomery	840	5,729	3,039	2,690	5,471	258	6.8	19,656	3.7	17.9	3,512	1,819	0.52	780	260	4.2	2.2	
Hot Spring	690	7,775	4,002	3,773	7,030	745	11.3	30,537	6.9	26.4	8,068	3,755	0.47	705	235	11.7	5.4	
Garland	580	9,023	4,761	4,262	7,457	1,566	15.6	16,748	4.5	5.9	993	534	0.54	810	270	1.7	0.9	
Saline	690	8,953	4,625	4,328	7,583	1,367	13.0	35,604	8.1	24.8	8,846	5,075	0.57	855	285	12.8	7.4	

## COTTON PRODUCTION IN ARKANSAS.

TABLE I.—AREA, POPULATION, TILLED LAND, AND COTTON PRODUCTION—Continued.

Counties.	Land area.	POPULATION.						TILLED LAND.		COTTON PRODUCTION.							Cotton acreage per square mile.	Bales per square mile.
		Total.	Male.	Female.	White.	Color'd.	Average per square mile.	Acres.	Per cent. of area.	Per cent. of tilled lands devoted to cotton.	Acres.	Bales.	Average per acre.					
													Bale.	Seed-cotton.	Lint.			
RED-LOAM REGION—continued.		Sq. mls.												Lbs.	Lbs.			
Pulaski.....	810	32,010	17,294	15,322	17,067	14,949	40.3	73,019	14.1	30.0	20,007	20,430	0.70	1,050	350	35.0	25.2	
Perry.....	580	3,872	2,010	1,862	3,072	800	0.7	15,706	4.2	32.4	5,082	3,314	0.65	975	325	8.8	5.7	
Yell.....	900	13,852	7,193	6,059	12,733	1,119	15.4	55,220	9.6	30.1	16,598	10,428	0.63	945	315	18.4	11.0	
Scott.....	920	9,174	4,706	4,468	9,085	89	10.0	30,621	5.2	20.0	8,867	4,826	0.54	810	270	9.0	5.2	
Sebastian.....	570	19,500	10,123	9,437	17,070	1,530	34.3	68,595	18.8	28.8	19,722	11,112	0.56	840	280	34.0	10.5	
Logan.....	670	14,885	7,763	7,122	13,901	984	22.2	65,784	15.3	24.9	16,377	9,752	0.60	900	300	24.4	14.0	
Conway.....	540	12,755	6,767	5,988	9,546	3,209	23.0	51,967	15.0	20.7	15,424	9,096	0.50	885	295	23.6	10.8	
Faulkner.....	650	12,786	6,735	6,051	11,368	1,418	19.7	52,515	12.6	30.0	15,749	8,692	0.55	825	275	24.2	13.4	
White.....	1,100	17,794	9,257	8,537	15,761	2,033	16.2	70,827	11.3	20.2	23,304	11,821	0.51	765	255	21.2	10.7	
Van Buren.....	1,100	9,565	4,858	4,707	9,447	118	8.7	38,905	5.5	18.2	7,084	3,377	0.48	720	240	6.4	3.1	
Pope.....	800	14,322	7,371	6,951	13,413	909	17.9	63,312	12.4	23.8	15,062	8,700	0.58	870	290	18.8	10.0	
Johnson.....	660	11,565	5,944	5,621	11,073	492	17.5	48,153	11.4	25.4	12,217	7,769	0.64	960	320	18.5	11.8	
Franklin.....	700	14,951	7,861	7,090	14,455	406	21.4	58,176	13.0	27.0	16,265	9,268	0.57	855	285	23.2	13.2	
Crawford.....	620	14,740	7,607	7,133	13,332	1,408	23.8	59,714	12.8	31.8	16,145	8,980	0.56	840	280	20.0	14.5	
Washington.....	940	23,844	12,112	11,732	22,894	950	25.4	116,871	10.4	0.3	302	133	0.44	660	220	0.3	0.1	
Benton.....	880	20,328	10,383	9,945	20,167	161	23.1	111,279	10.8	0.3	286	126	0.44	660	220	0.3	0.1	
Total.....	16,805	290,291	150,670	139,621	255,171	35,201	17.3	1,133,651	10.5	22.1	250,511	144,864	0.58	870	290	14.0	8.0	
NORTHERN BARRENS AND HILLS.																		
Madison.....	880	11,455	5,747	5,708	11,331	124	13.0	67,746	11.0	0.4	255	120	0.51	765	255	0.3	0.1	
Newton.....	810	6,120	3,143	2,977	6,115	5	7.6	24,333	4.7	19.7	2,602	1,400	0.54	810	270	3.2	1.7	
Searey.....	700	7,278	3,720	3,558	7,262	16	10.4	28,581	6.4	15.1	4,320	2,464	0.57	855	285	6.2	3.5	
Stone.....	640	5,089	2,593	2,496	4,984	105	8.0	20,906	5.1	17.5	3,656	2,049	0.50	840	280	5.7	3.2	
Independence.....	880	18,086	9,313	8,773	16,703	1,383	20.6	81,220	14.4	24.1	19,602	11,156	0.57	855	285	23.3	12.7	
Randolph.....	640	11,724	6,113	5,611	11,097	627	18.3	53,016	12.9	20.8	11,028	6,248	0.57	855	285	17.2	9.8	
Sharp.....	590	9,047	4,623	4,424	8,871	176	15.3	43,191	11.4	19.6	8,455	4,350	0.51	765	255	14.3	7.4	
Izard.....	580	10,857	5,525	5,332	10,635	222	18.7	54,705	14.7	16.5	9,020	4,800	0.53	795	265	15.6	8.3	
Fulton.....	660	6,720	3,568	3,212	6,684	36	10.2	24,259	5.7	16.5	3,094	2,438	0.61	915	305	6.1	3.7	
Baxter.....	500	6,004	3,131	2,873	5,959	45	12.0	27,564	8.6	17.4	4,798	2,870	0.60	900	300	9.0	5.0	
Marion.....	640	7,907	4,019	3,888	7,864	43	10.8	28,673	7.0	24.8	7,110	3,925	0.55	835	275	11.1	6.1	
Boone.....	640	12,146	6,104	6,042	12,058	88	19.0	56,883	13.9	9.0	5,095	2,686	0.53	795	265	8.0	4.2	
Carroll.....	700	13,337	6,979	6,358	13,272	65	10.1	43,903	6.8	2.2	982	502	0.51	765	255	1.4	0.7	
Total.....	8,800	125,770	64,518	61,252	122,835	2,935	14.2	548,980	9.7	14.7	80,932	45,032	0.56	840	280	9.1	5.1	



# TABULATED RESULTS OF THE ENUMERATION.

5

TABLE II.—ACREAGE AND PRODUCTION OF LEADING CROPS.

Counties.	COTTON.		INDIAN CORN.		OATS.		WHEAT.	
	Acres.	Bales.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
The State .....	1,042,976	608,256	1,292,310	24,156,417	166,513	2,219,822	204,084	1,269,715
ALLUVIAL REGION.								
<i>Mississippi bottom lands.</i>								
Chicot .....	26,941	25,338	7,309	117,301	80	872		
Desha .....	21,159	18,108	9,810	189,177	169	8,139	18	171
Crittenden .....	24,413	16,039	9,810	216,194	73	1,128	20	200
Mississippi .....	18,326	10,430	9,858	314,116	181	4,240	68	655
Total .....	85,839	69,910	36,796	827,878	503	8,879	106	1,026
<i>Crowley's ridge.</i>								
Phillips .....	42,654	20,070	19,685	332,585	834	13,410	36	367
Monroe .....	22,017	14,106	12,945	208,607	764	13,995	60	200
Lee .....	33,009	21,147	16,124	271,650	806	12,047	53	620
Woodruff .....	18,124	12,311	11,146	229,962	497	9,908	307	1,867
Saint Francis .....	11,857	5,966	9,934	197,061	706	8,849	354	1,835
Cross .....	7,607	4,768	6,985	138,614	835	11,121	471	2,643
Poinsett .....	2,373	1,514	3,007	87,133	258	3,400	237	1,522
Jackson .....	21,718	13,895	17,861	384,398	599	6,399	919	7,415
Lawrence .....	19,768	6,480	19,902	522,720	3,256	40,851	2,591	18,662
Craighead .....	7,246	4,374	15,023	367,451	1,374	20,260	2,794	15,552
Greene .....	6,886	3,711	14,068	347,926	1,802	29,110	1,702	10,475
Clay .....	4,239	2,307	13,970	343,836	977	12,406	2,240	12,408
Total .....	188,498	119,649	161,559	3,432,003	12,609	181,846	11,725	74,573
GRAY SILT PRAIRIE REGION.								
Arkansas .....	12,011	8,508	10,248	136,232	685	10,354	48	539
Prairie .....	12,124	6,977	10,113	135,462	2,391	31,944	457	2,214
Lonoke .....	20,910	11,704	17,502	249,764	3,310	49,674	1,131	5,563
Total .....	45,045	27,189	37,863	521,458	6,386	91,972	1,636	8,316
YELLOW-LOAM REGION.								
Ashley .....	19,555	11,871	15,335	152,289	1,411	12,218	14	85
Union .....	30,196	11,013	27,795	171,779	1,249	6,405	103	243
Columbia .....	32,427	13,039	28,868	235,376	3,241	22,545	1,019	3,548
La Fayette .....	10,611	6,399	8,366	97,371	140	1,302	13	77
Miller .....	19,111	11,643	16,672	223,728	691	6,798		
Little River .....	10,368	7,116	9,141	166,310	582	9,523	118	774
Sevier .....	7,283	4,075	10,557	153,839	1,045	12,693	1,012	4,740
Howard .....	12,259	7,051	17,671	272,635	2,486	20,409	3,357	13,618
Hempstead .....	27,142	13,085	30,284	418,837	3,489	42,670	1,289	6,702
Nevada .....	23,925	10,520	23,173	253,222	1,329	11,851	635	2,807
Osachita .....	23,855	8,849	21,924	165,655	567	2,921	164	693
Calhoun .....	13,377	5,370	12,910	100,688	873	5,888	128	652
Bradley .....	12,221	4,900	12,330	97,241	1,073	8,316	336	1,309
Drew .....	21,796	9,964	20,005	145,401	1,488	11,522	280	1,244
Lincoln .....	17,619	11,563	12,547	144,068	1,400	15,210	185	1,021
Dorsey .....	15,462	6,146	14,737	113,630	1,777	13,967	660	3,319
Dallas .....	14,306	6,157	13,830	136,760	894	5,749	443	2,010
Clark .....	25,092	13,924	27,005	470,352	2,121	25,969	2,515	11,953
Grant .....	9,680	3,999	12,765	149,854	1,244	10,403	573	2,616
Jefferson .....	45,426	34,588	16,839	299,508	898	6,566	32	278
Total .....	391,551	201,612	352,254	3,964,052	27,498	252,976	12,876	57,680
RED-LOAM REGION.								
Pike .....	7,841	3,787	11,604	188,256	1,232	11,043	2,032	8,893
Polk .....	4,230	2,061	10,616	179,400	1,416	15,816	2,424	13,096
Montgomery .....	3,512	1,819	9,629	187,991	825	9,000	3,023	16,766
Hot Spring .....	8,068	3,755	13,602	268,650	910	11,191	1,377	7,384
Garland .....	993	534	8,785	153,434	1,281	17,656	1,445	7,442
Saline .....	8,846	5,075	15,821	292,628	2,302	38,046	1,454	7,589
Pulaski .....	29,097	20,439	20,843	369,911	2,199	32,976	1,076	5,623
Perry .....	5,082	3,314	6,469	134,935	842	11,119	561	2,881
Yell .....	16,698	10,428	22,791	495,138	2,654	42,480	5,954	32,678
Scott .....	8,867	4,826	15,435	279,533	2,345	29,061	1,956	7,957
Sebastian .....	19,722	11,112	28,283	553,513	4,378	53,976	6,095	32,157

## COTTON PRODUCTION IN ARKANSAS.

TABLE II.—ACREAGE AND PRODUCTION OF LEADING CROPS—Continued.

Counties.	COTTON.		INDIAN CORN.		OATS.		WHEAT.	
	Acres.	Bales.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
RED-LOAM REGION—continued.								
Logan .....	16,877	9,752	24,130	491,520	3,543	46,918	4,376	20,211
Conway .....	15,424	9,096	15,959	349,204	1,086	24,674	1,778	9,340
Faulkner .....	15,749	8,692	19,047	347,062	2,793	39,247	3,300	18,197
White .....	23,304	11,821	29,148	444,893	6,957	95,359	3,509	17,220
Van Buren .....	7,084	3,877	17,548	345,315	2,627	31,066	3,325	15,293
Pope .....	15,062	8,700	24,736	494,773	2,688	30,741	7,772	34,439
Johnson .....	12,217	7,769	20,003	463,488	2,763	34,693	3,509	18,496
Franklin .....	16,205	9,208	23,024	547,723	3,383	52,509	6,019	31,809
Crawford .....	16,145	8,980	19,777	405,356	2,369	33,216	5,347	31,040
Washington .....	302	133	53,083	1,225,557	13,103	220,617	28,507	224,609
Benton .....	286	126	49,135	1,119,834	13,912	245,362	21,461	156,087
Total .....	250,511	144,864	460,674	9,398,210	76,797	1,127,986	116,298	719,219
NORTHERN BARRENS AND HILLS.								
Madison .....	255	129	29,514	720,428	4,368	75,068	12,318	85,414
Newton .....	2,602	1,406	12,217	287,869	1,906	23,810	2,241	14,302
Searcy .....	4,320	2,464	14,399	362,828	1,901	24,776	3,085	19,179
Stone .....	3,656	2,049	9,156	209,375	1,429	19,297	2,006	13,537
Independence .....	19,602	11,156	31,114	691,188	5,100	61,209	8,055	57,104
Randolph .....	11,028	6,248	27,312	728,403	2,903	33,137	4,016	31,244
Sharp .....	8,455	4,350	18,508	432,570	4,411	52,241	3,178	18,908
Izard .....	9,029	4,800	21,728	451,004	4,913	49,593	4,830	25,002
Fulton .....	3,994	2,438	11,686	299,930	1,692	20,827	1,602	10,024
Baxter .....	4,798	2,879	10,804	261,337	3,024	21,678	1,776	9,895
Marion .....	7,116	3,925	13,034	330,805	1,935	26,794	2,494	13,816
Boone .....	5,095	2,686	20,713	553,945	5,752	92,372	8,409	56,581
Carroll .....	982	502	22,979	582,734	4,626	64,451	7,343	51,002
Total .....	80,982	45,032	249,164	6,012,813	42,010	556,163	61,443	408,898

---

PART I.

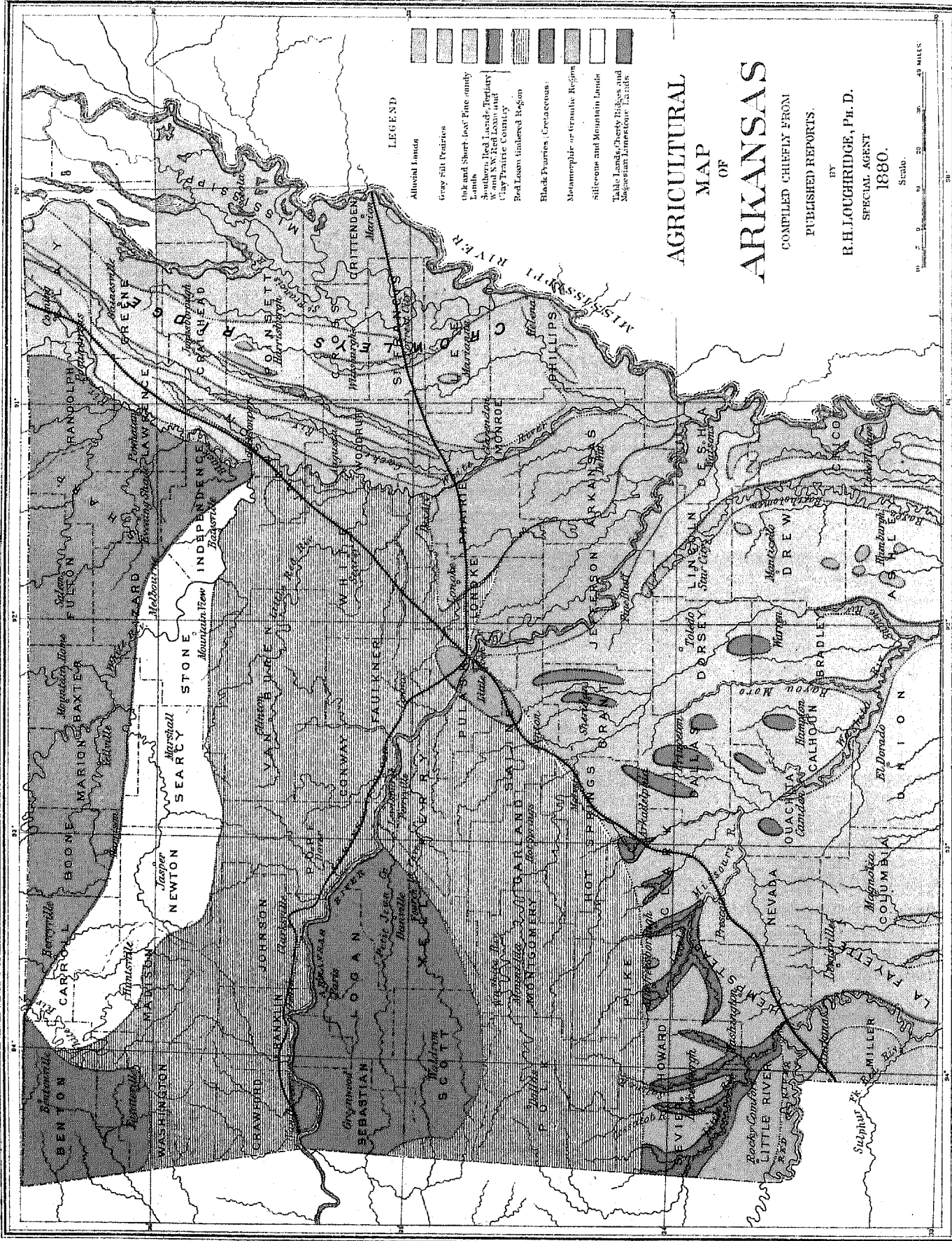
---

PHYSICO-GEOGRAPHICAL AND AGRICULTURAL FEATURES

OF THE

STATE OF ARKANSAS.

---



LEGEND

- Alluvial Lands
- Gray Silt Terraces
- Old and Short-leaf Pine sandy Lands
- Southern Red Limestone, Tertiary and SW Red Limestone and Clay Prairie Country
- Red Limestone Timbered Region
- Black Pebbles, Cretaceous
- Metamorphic or Granitic Region
- Siliceous and Mountain Lands
- Table Lands, Cherty Ridges and Siliceous Limestone Lands

# AGRICULTURAL MAP OF ARKANSAS

COMPILED CHIEFLY FROM  
PUBLISHED REPORTS.

BY  
R. H. LOUGHRIDGE, Ph. D.  
SPECIAL AGENT  
1880.

Scale  
0 10 20 30 40 MILES

## PHYSICAL AND AGRICULTURAL FEATURES OF THE STATE OF ARKANSAS.

The state of Arkansas(*a*) lies between parallels 33° and 36° 30' north latitude, while the extreme limits east and west are 89° 40' and 94° 42' west longitude. It covers altogether 53,850 square miles, including about 805 miles of water surface, and is divided into 74 counties, whose land areas vary in size from 490 to 1,100 square miles, according to the determinations made by Mr. Henry Gannett, of the Census Office. Nearly the entire surface of the state is well timbered with a large variety of growth.

**SURFACE FEATURES.**—The Mississippi river borders the state on the east, its broad bottom lands on the north reaching far westward from the river, some 60 miles, to the foot of Crowley's ridge, beyond the Saint Francis river. On the south these lands are narrower, and near the Louisiana line they are interspersed with ridges and upland peninsulas. Crowley's ridge is one of the most prominent features in this region. Lying between the White and the Mississippi rivers, this ridge, extending from the extreme northeastern part of the state southward to Helena, in Phillips county, with an elevation of from 100 to 150 feet, forms a sudden termination to the low swamps of the Mississippi and Saint Francis bottoms; but this elevation rapidly diminishes westward, with flat lands, prairies, and low sandy ridges, to White river, at the border of the hilly and mountainous region of northern Arkansas and the prairies of the south. Another broad alluvial region, bordering the Arkansas river on the north side, extends from near Little Rock (on the line of the rocky and hilly region) southeastward, and, embracing all the country lying between the river and bayou Meta, becomes again narrow at the junction of the two streams. Its width in one place is said to be as much as 30 miles, and the region presents very much the same features as that of the Mississippi. Broad alluvial bottom lands also border that portion of the Red river embraced in this state and the southern portion of Ouachita county near the state line.

A view of the state northward from the line of Louisiana to Missouri presents the following general topographical features in addition to those already given: Along the southern border the country is undulating and somewhat hilly, and is timbered with a prominent growth of short-leaf pine, with oak and hickory—the continuation of the Tertiary yellow-loam region of Louisiana and Texas. Northward the surface becomes more and more hilly, and is interspersed with red lands and Tertiary iron-ore hills. On the northeast of these, after passing the wide bottom plain lying between the Arkansas river and bayou Meta, we reach a large area of silty prairies, which separate this region from the Mississippi alluvial and Crowley's Ridge regions; while on the southwest there is a region, interspersed with small black Cretaceous prairies, which occupies the lowlands along the streams and at the foot of the pine ridges. The line marking the limit of this pine-hill country would pass from near Des Arc, on White river, in Prairie county, nearly westward to Little Rock, thence southwest to Arkadelphia, in Clark county, and westward through the middle of Sevier county into the Indian territory.

Northward from this line we enter upon a hilly and broken country, with a few ranges of high hills and mountains composed of sandstones and mill-stone grit, the valley lands being derived from the associated red shales. The surface of the country is well timbered with oak and hickory as far north as the range of mountains lying between Polk and Scott counties on the west. Open and level prairies are found interspersed throughout the region northward to the Arkansas river in the counties of Scott, Sebastian, Logan, and Yell, but occur chiefly in the first two. North of the river, after passing a timbered belt of country similar to that on the south, we reach the Ozark Mountain region of high hills and ridges, which increase in altitude from but a few hundred feet on the south to 1,000 or 1,500 feet above the general level of the country on the northwest, where they leave the state. This country is well timbered with a great variety of growth, except on some of the highest ridges, where the poor sandy

*a* The proper pronunciation of this name is doubtless that of the Indian tribal name from which it was originally derived, viz, *Akansa* or *Arkansa*, the first and last syllables being alike, with the accent on the first. A tribe of Indians of this name was found in this country by La Salle in 1680, and is mentioned in the account of his expedition. After the French took possession of this territory their writers quite naturally added the present final letter "s" to the name. At the present time the old pronunciation is still given to it, not only throughout the adjoining states, but by the Indians on the west, through whose territory the river of the same name runs.

and cherty soil will support little else than grasses, weeds, and stunted oaks. Little or no limestone has been observed southward from the Louisiana line to these mountains, but it now appears at the foot and on the sides of the hills, producing lands of richness and fertility. The hilly and broken character of the country continues to the Missouri line, and in the extreme northern tier of counties we find a region of cherty limestone hills and small open prairies and barrens, the latter having often a soil rich in potash, lime, and phosphoric acid. In the middle of this region the prairies are less extensive than on the extreme west, where, in Benton county, they open out into the broad and more level prairie region of the Indian territory. The hills are from 400 to 600 feet high, and are largely timbered with pine and other growth, except in places where the soil is too thin for anything else than scrub oaks.

**CLIMATE.**—The records of the Smithsonian Institution for a period of many years, as summed up in the *Smithsonian Contribution to Knowledge*, volume XXI, place the annual mean temperature of that part of the state lying south of the Ozark mountains (or a line from the junction of White and Black rivers, in Independence county, westward to Fayetteville, in Washington county) at from 60° to 64°, and thence to the Missouri line at 56° F. For the winter months during this time the average temperature in the northern counties was from 28° to 40°, and in the southern counties from 40° to 52°. The annual mean at Helena, in Phillips county, was 61.1°; at Little Rock, 62.3°; Fort Smith, 60.1°, and at Washington, on the southwest, 61.5°. For the summer months the mean temperature for the time mentioned was from 76° to 80° over all of the state, except in the extreme southeastern counties, where the mean was from 80° to 88°. July is generally the hottest month, the thermometer sometimes rising as high as 100°. The nights are said to begin to grow cool about the middle of August, and the first "black" frost appears about the last of October.

**Rainfall.**—The prevailing winds are from the south, and, charged as they are with the vapors of the Gulf, we find the greatest condensation or rainfall in the southern half of the state. As the result of many years of observation the following facts have been brought out by Mr. Schott in a late publication of the Smithsonian Institution: The average number of rainy days in each year for fifteen years has been 75. The highest annual rainfall occurs in the southwestern counties, and averages 56 inches. From Louisiana northward to a limit marked by a line from the northeastern corner in Mississippi county to the lower part of Sebastian county, on the west, an average of from 44 to 56 inches falls yearly, while northward over the rest of the state a 38-inch fall is reported.

During the winter months the greatest fall (16 inches) occurred in the southwestern counties and along the Mississippi river from the mouth of the Arkansas river northward to Cross and Crittenden counties. There was a fall of 12 to 15 inches in the southeastern region, which may be bounded west by a line from the lower part of Poinsett county to Jacksonport, at the bend of White river; thence southward with a curve passing south of Little Rock, west to Mount Ida, Montgomery county, and south to Red river. Over the rest of the state on the north and west the rainfall for the winter was from 6 to 8 inches. These estimates include the snow that falls during these months, sometimes to a depth of several inches. During the spring months the southern counties were favored with over 15 inches of rain, while north of a line from Sevier county to Little Rock, Arkansas, and Memphis, Tennessee, the fall was from 12 to 15 inches, except on the extreme northwest, where it was less than 12 inches.

During the summer months the rainfall was more evenly distributed over the state, and averaged from 10 to 14 inches, a maximum of 18 inches occurring at Helena, in Phillips county, on the Mississippi river, and a minimum of less than 10 inches in the northwestern counties of the state. The autumn months were drier, the heaviest rains, more than 12 inches, occurring along the Red river, on the southwest. From 10 to 12 inches was reported over the rest of the state, except on the northwest and in the Saint Francis bottom lands, on the northeast, where it was less than 10 inches.

**DRAINAGE.**—Apart from the Mississippi and Saint Francis rivers on the east and northeast, the northern part of the state is drained by White river, the middle by the Arkansas, the south by the Ouachita, and the southwest by Red river.

Arkansas river, which is next in size to the Mississippi, divides the state into two almost equal parts. Entering on the west from the Indian territory, its course is very irregular, at first mostly eastward, and then, turning to the southeast, its waters flow into the Mississippi in Desha county. Its basin, covering an area of 11,270 square miles, is bounded on the north by the Ozark mountains, and has an average width of from 20 to 30 miles. On the south its width along the line of the Indian territory is about 50 miles, bounded by the range of Rich and Fourche La Pave mountains, which have an east and west trend, and approach near the river in Perry county. Thence southeastward the river basin becomes quite narrow, its southern rim lying very near the river.

White river is the most important stream in the northern part of Arkansas, draining, with its tributaries, about 17,400 square miles; an area greater than that of any other river within the state. This river rises in the southern part of Washington county, flows northward into Missouri, whence it soon turns southeastward to the lowlands of the Mississippi river, where, after its junction with the waters of the Black river from the north, it continues southward, and unites with the Arkansas river near its junction with the Mississippi. (a)

a In former times the mouth of the Arkansas river was at Napoleon, but so near was the mouth of White river to the Mississippi that its waters during high-water floods usually found their way direct to the latter river independent of the Arkansas. A permanent change took place, and the Arkansas river has since then followed the old White river cut-off, emptying its waters into the Mississippi several miles north of Napoleon.



The Ouachita river basin includes very nearly the entire country south of the Arkansas basin, an area of about 11,800 square miles, while that of Red river, on the southwest, has only an area of about 4,500 square miles.

**GEOLOGY.**—The oldest occurring rocks of the state are probably those of the Lower Silurian age in the northern counties, embracing a few outcrops of the Potsdam sandstone and large areas of later cherty magnesian limestones. With a broad base resting against Black river north of its junction with White river, covered eastward by Quaternary deposits, the triangular area of this formation extends westward, with narrowing limits in this state, until it passes out near the western boundary. Dipping toward the south, it is overlaid by the sub-Carboniferous Archimedes limestones, chert, and sandstones, which form the southern border of the Ozark mountains in the northern portions of Stone, Searcy, Newton, Madison, and Carroll counties. So far as known, the Upper Silurian and the Devonian formations are not represented in the state, except perhaps in very small areas. A southern dip carries the sub-Carboniferous under the Coal Measures, which constitute the most extensively developed geological region in the state. This is represented by the sandstones and red shales of the millstone grit, which form the hills and high ridges, its shales also underlying much of the valley land. Coal-beds appear in many of the counties. The rock strata are generally regular, except in the lower part of the region, where the effects of granitic disturbance are seen in upturnings and contortions and the presence of many mineral veins.

The next older formation represented is the Cretaceous, and this occurs in the southwestern part of the state. It enters the state from the Indian territory with a width of about 30 miles, reaching from Ultima Thule, in Sevier county, to Red river, but gradually narrows eastward to a point at Arkadelphia, on the Ouachita river, in Clark county. Characteristic fossils of this formation are abundant in localities, and are probably of the rotten-limestone group. This is the northeastern termination of the great Cretaceous belt, that, extending westward through the southern part of the Indian territory, turns southward through the central part of Texas to the southern foot of the table-lands and the Llano Estacado, which are also but a continuation of the same formation northwestward into New Mexico.

The black, waxy, and open prairies, that form so prominent a feature of the formation elsewhere, are in this state found only in small patches in the lowlands, the formation being covered in the uplands by the Quaternary sands and clays, which form hills bearing a short-leaf pine and other timber growth. Salt-licks are a feature of the Cretaceous lands of this state, especially in Sevier county (as well as of Louisiana).

During or immediately after the Cretaceous period there seems to have occurred a great disturbance or upheaval, bringing to the surface the granitic and metamorphic rocks, which cover large areas of country in Saline and Pulaski counties, with also a small outcrop in Hempstead county. At the same time the shales and sandstones of the region southwestward in Garland, Hot Spring, Pike, Polk, and the northern portion of Sevier counties were upturned, contorted, and, in some instances, broken and altered. (a)

On the northwest of Little Rock the continuation of the line of disturbance is observed in the upturned or folded strata of the Ozark mountains, which pass into Missouri from Carroll county. Argentiferous galena ores, in veins, are an accompaniment of this formation in Arkansas, the Kellogg silver mines, a few miles north of Little Rock, being the most noted occurrence. Novaculite (whetstone) and sandstone, filled with crystals of quartz, are among the most commonly occurring metamorphic rocks, the former being found in abundance chiefly around the celebrated Hot Springs, in Garland county.

The Tertiary formation is represented in this state only by the marl-beds and limestones of the Eocene, which extends southward into Louisiana. Marl-beds, with characteristic Tertiary fossils, occur at the foot of Crowley's ridge, in Saint Francis county, and also in the counties lying south of Little Rock. Thick and extensive beds of lignite are said to be found in Ashley, Union, Bradley, and Calhoun counties, exposed in the banks of the streams. The Tertiary is all overlaid by beds of Quaternary sands, pebbles, and clays, which, by erosion, have been left as irregular hills and ridges, capped with ferruginous sandstone formed from these materials. Crowley's ridge, which forms so prominent a feature of the country lying between the Mississippi and the White rivers, is made up almost entirely of the material of this last group nearly to its entire height of from 100 to 150 feet, and throughout nearly the whole of its length, from the Chalk bluffs of Saint Francis river, in the extreme northeastern corner of the state, to Helena, on the Mississippi river, it is underlaid by Silurian and Carboniferous beds on the north and by Tertiary marls and limestones on the south.

**AGRICULTURAL FEATURES.**—The lands of the state may be grouped in two grand divisions, separated by a line from the western part of Clay county, on the northeast, along Black and White rivers to Des Arc, in Prairie county, and thence to Little Rock and Arkadelphia, on the southwest; thence west to Ultima Thule, on the line of the Indian territory, in Sevier county. Westward and northward of this line lie the rocky, hilly, and mountainous lands, or "up country"; but on the east and south the lands are more generally rolling, or level, sandy, and sometimes gravelly in character, and almost entirely free from rocks on the surface, excepting some scattered pieces of

a This granitic axis is very extensive, reaching westward into the Indian territory, with granite outcrops (penetrated by trap) at Boggy depot and Tishomingo, in the Chickasaw Nation, and other places; thence it turns southward into Texas, a large area of granite occurring in Llano and in Gillespie county, and passes southwestward into Mexico, as shown by several basaltic hills in Frio and Uvalde counties, as well as by the metamorphosed condition of the Cretaceous limestone beds in Kinney county, on the Rio Grande, and by the disturbed strata and the old volcanic cones at the Santa Rosa mountains in Mexico. (See *Mexican Boundary Survey Report*.)

ferruginous sandstone. This southern region also includes those river alluvial lands whose extensive areas make them of great agricultural value. The two divisions may be subdivided into other regions, whose lands differ from each other in some general and soil features, topographical position, etc., each region in turn having its soil varieties.

*The prairies of the state.*—The greater part of Arkansas is a well-timbered country, but there are several large regions of open prairies, each region differing from the others in topographical and geological features and elevation, as well as in the character of the lands. They may be separated into the following classes, and will be thus described:

1. Eastern Tertiary gray silt prairies, occurring chiefly in Lonoke, Prairie, and Arkansas counties, and in smaller areas in Lincoln, Drew, and Ashley on the south, and between White river and Crowley's ridge northward as far as Craighead county.
2. Black Cretaceous prairies, occurring in small bodies in the lowlands of the southwestern part of the state.
3. Reddish-loam prairies of the west, lying south of the Arkansas river. These lands overlie the coal-beds of the Carboniferous formation.
4. Sandy prairies in the northern part of the state, in the extreme tier of counties, underlaid by cherty sub-Carboniferous limestones. They are small in all of the counties except Benton, where commence the broad and open prairies of the Ozark region, extending into the Indian territory westward. These will be included in the description of the northern region.

AGRICULTURAL REGIONS.—The following is a list of the agricultural regions as at present determined, which will be separately described in the report:

1. Alluvial lands.
  - a. Bottom lands of the Mississippi, Arkansas, and Red rivers, and their larger tributaries.
  - b. Crowley's ridge of the Mississippi plain.
2. Gray silt prairies of eastern Arkansas.
3. Yellow-loam and sandy pine-hills region.
  - a. Red hills.
  - b. Sandy pine hills.
  - c. Flat sandy and pine lands.
4. Black lands of the southwest, prairie in part.
5. Red-loam region, shaly, rocky, and hill lands.
  - a. Timbered lands.
  - b. Prairie lands.
  - c. Northwestern prairie region.
  - d. Metamorphic lands.
6. Northern barrens, hills, prairies, and siliceous lands.
  - a. Siliceous lands of chert, sandstone, and limestone.
  - b. Barrens and cherty and magnesian limestone lands.

These regions are mostly continuations of similar regions in the adjoining states on the north and south, some of them terminating abruptly against the broad alluvial region of the Mississippi river. No single region is continuous through the state, even the Mississippi alluvial being interrupted by the high Crowley's ridge, which reaches to the river itself. The outlines, as defined on the map accompanying this report, are merely general, as absolute correctness would require a very detailed survey of the border of each region.

STATISTICS.—*Population.*—The number of inhabitants of the state in 1880 was 802,525, and these, if evenly distributed, would average a little more than fifteen persons per square mile. We find, however, that the most populous counties are those along the Arkansas river, and that, together with Phillips on the east (in which the large town of Helena is located), Hempstead on the southwest, and Washington and Benton on the northwest, they include all of those counties whose average is more than twenty persons per square mile, their combined population also comprising three-eighths of that of the state. That this should be the case is not surprising, for the river has long afforded excellent facilities for the transportation of supplies and produce, and a railroad along its northern banks has aided in the settlement of the country. The two grand divisions of the state, the rocky and mountainous on the northwest and the sandy and rolling lower lands of the southeast and east, each comprising about one-half of the area of the state, have about the same population. The relative proportion of whites to negroes is nearly three of the former to one of the latter, the whites comprising 73.7 per cent. of the entire population; but the two races are not evenly distributed between the two divisions of the state given above. The well-known preference of the negro for the easily cultivated and sandy "low country" is as well shown in Arkansas as in any other southern state, and the line marking the separation of the two agricultural divisions may also be properly called the "color line" between a region with comparatively few negroes and another in which the two races are nearly evenly represented, the whites predominating. Of the entire negro population, 18 per cent. only is found in the "up country", or northern division, which embraces the mineral region, while 82 per cent. belong to the "low country", comprising the sand and pine hills of the south, Crowley's ridge and the eastern sandy prairies, and the alluvial lands of the Mississippi, Arkansas, Red, and other streams. On the contrary, 64 per cent. of the white population



is found on the north and but 36 per cent. in the low country. In the counties of Chicot, Desha, Ashley, Lincoln, Jefferson, Phillips, Monroe, Lee, Woodruff, and Crittenden, which are largely alluvial bottoms, the negro population is predominant (with an aggregate ratio of 100 white to 218 colored), the malaria of these lowlands affecting them much less than it does the whites. The counties of La Fayette, Little River, and Ouachita on the southwest have also a predominant negro population, also due probably to the large amount of bottom lands which are in cultivation.

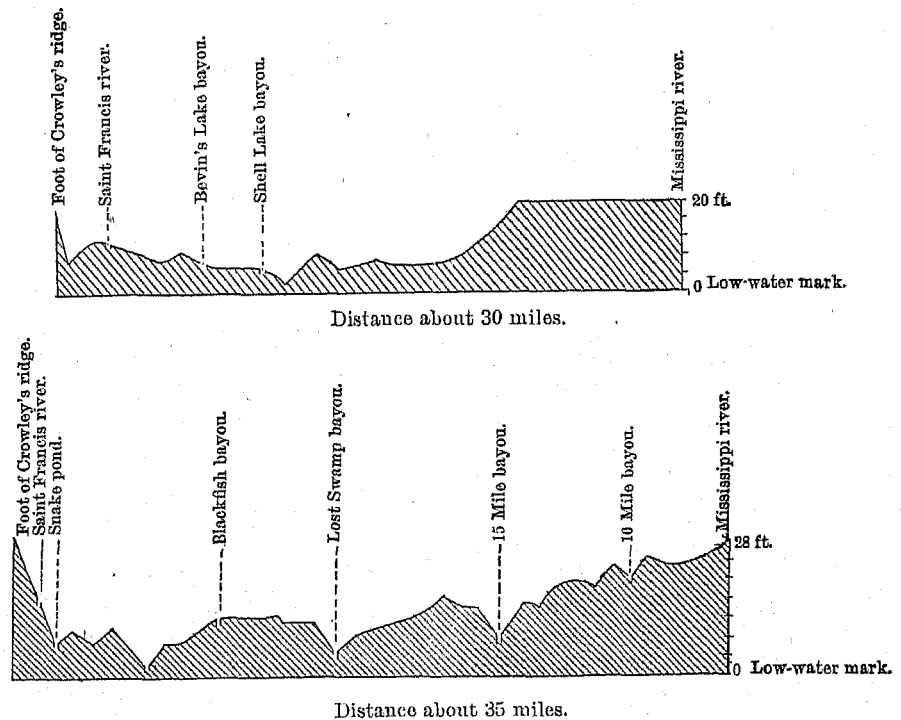
**LANDS UNDER CULTIVATION.**—The total land area of Arkansas has been approximately given at 33,948,800 acres. Of this only about one-tenth is under cultivation, averaging a little more than 64 acres per square mile. The remaining 90 per cent. is still in its original virgin condition, mostly covered with a forest growth, and much of it is either too swampy or too hilly and broken for successful tillage. A large proportion of the alluvial lands of the Mississippi and Arkansas rivers are of this swampy overflowed character, and can be made fit for cultivation only by a system of levees. The region most generally settled and under tillage is that of the extreme northern and northwestern counties, the average being 90 acres per square mile, Benton county, with its average of 126 acres, ranking as first in the state. The yellow loam and sandy pine-hills of the south are next, with an average of 69.1 acres. Other regions average from 50 to 60 acres, the Mississippi alluvial naturally being lowest, because of its lands being subject to overflow. Phillips county, fronting on the Mississippi river, but having a large proportion of ridge lands, ranks as second in its average of tilled area, 125.3 acres; Washington third, and Sebastian fourth, with its average of 120 acres. Poinsett, though crossed by Crowley's ridge, has the least average of tilled lands, 10.1, and ranks as lowest in the state in this regard, while the upland counties of Montgomery, Polk, Perry, and Garland have only from 23 to 28 acres per square mile.

There are but seven counties whose average is as much as 100 acres per square mile, while in sixteen the average is between 75 and 100 acres, and in twenty-six between 50 and 75 acres, all others being below 50 acres to the mile.

#### ALLUVIAL LANDS.

**THE MISSISSIPPI AND SAINT FRANCIS ALLUVIAL REGION.**—The alluvial or bottom lands that border the Mississippi river on the west are most extensive northward from the junction of the Saint Francis river, and have the greatest width in this state, 50 or more miles, opposite the northern line of Craighead county. The region extends

westward beyond Saint Francis river to the foot of the high ridge known as Crowley's ridge, which forms the western border southward to Helena, in Phillips county, on the Mississippi river, and covers an area of about 4,220 square miles, exclusive of Crowley's Ridge region. The surface of the country is rather level, diversified with low ridges, lakes, sloughs, bayous, and streams, mostly tributary to the Saint Francis river, and is well timbered with a growth of walnut, cottonwood, ash, elm, hickory, sweet and black gums, dogwood, hackberry, sycamore, honey-locust, white oak, pecan, black and red haw, box-elder, sassafras, beech, and maple on the higher lands, mostly above overflow; sweet and black gums, oak, hackberry, hickory, etc., on the lands subject to annual overflow; and ash, elm, hickory, cypress, water oak, and willow in the deep swamps. The highest lands of the bottoms are those that border the Mississippi river, known as front-lands, and are formed from the more recent alluvial deposits, consisting of fine loams and silts, extremely rich and productive under cultivation. Westward to Crowley's ridge there is a rapid descent in the surface of the bottoms, and, as shown in the following sections, their general level is from 10 to 20 feet below the Mississippi front-lands. The banks of the Saint Francis and the various bayous are also much lower than those of the Mississippi, and, like the latter, have been formed from alluvial deposits, the beds of the streams gradually filling up, until they have become in most instances higher than the intermediate swamps and lowlands.



Sections showing the surface of the Saint Francis or Mississippi river bottom from the levees near Memphis westward to Crowley's ridge, from report on the Mississippi river, by Humphreys and Abbot, 1861.

Westward to Crowley's ridge there is a rapid descent in the surface of the bottoms, and, as shown in the following sections, their general level is from 10 to 20 feet below the Mississippi front-lands. The banks of the Saint Francis and the various bayous are also much lower than those of the Mississippi, and, like the latter, have been formed from alluvial deposits, the beds of the streams gradually filling up, until they have become in most instances higher than the intermediate swamps and lowlands.

## COTTON PRODUCTION IN ARKANSAS.

The greater part of the bottom lands are subject to overflow, the mean depths in the great flood years being estimated by the United States engineer corps to be about 3 feet, exclusive of the ridge lands. In the northern part of the region there is a large area of what is known as "sunk land" now covered by large lakes. The sudden sinking of the surface occurred during the New Madrid earthquake of 1811, and the lands are now 15 or 20 feet below flood levels.

The lands of this region comprise light sandy alluvial soils along the front-land of the Mississippi and on the low ridges of the interior and a heavy and stiff black buckshot soil on the overflowed lands, the latter soil deriving its name from a tendency to crumble into grains or small irregular balls on drying after being disturbed. This soil becomes hard and is difficult to plow if allowed to dry before tillage. Both this and the alluvial sandy loam of the ridges are very productive under proper cultivation, yielding from one to two bales of cotton lint or 70 to 80 bushels of corn per acre. Still southward on the Louisiana line the bottoms of the Mississippi river and bayous Bartholomew and Maçon preserve the same character of soil and growth as already given. The region is, however, penetrated by oak and short-leaf pine peninsulas from the interior with their sandy and gravelly upland soils, and isolated ridges of the same separate the three streams from each other. The bottom lands in this part of the region are about the only lands under cultivation, the uplands being too poor.

The following analyses are given to show the chemical composition of the lands of this region:

No. 217. *Black sand bottom land*, foot of Crowley's ridge, Greene county. Timber growth, gum, walnut, and poplar; undergrowth, papaw and spicewood; Quaternary deposits. The dried soil is of a light umber color, sandy, containing much clear and some reddish rounded grains.

No. 219. *Sandy subsoil* of the above. Sandy, and dirty-gray buff colored.

No. 228. *Genuine black sand land*, Greene county. Growth, poplar, gum, and oak; undergrowth, papaw and spicebush; Quaternary deposits. The dried soil is of an umber color. Some small rounded pebbles were sifted out of it with the coarse sieve.

No. 230. *Red underclay* of the above. Light brick-red color.

No. 419. *Saint Francis bottom soil*, Craighead county. Growth, gum, elm, white oak, black hickory, and hackberry. The dried soil is of a light mouse-color, in very tenacious lumps, and contains vegetable twigs, remains of leaves, etc.

No. 422. "*Gum soil*," Saint Francis River bottom, Crittenden county. Dried soil of a light mouse-color, in very tenacious lumps.

No. 420. *Bottom land* near No. 422. Growth, large oaks; dried soil is of a light mouse-color, in quite tenacious lumps.

No. 423. *Genuine buckshot land*, bottom land, Sec. 15, T. 7 S., R. 4 W., Crittenden county. Dried soil is mouse-colored, in very tenacious lumps.

*Saint Francis bottom lands.*

	GREENE COUNTY.				CRAIGHEAD COUNTY.	CRITTENDEN COUNTY.			
	BLACK SANDY LANDS.					BUCKSHOT CLAY LANDS.			
	Soil.	Subsoil.	Soil.	Red underclay.		Soil.	Gum soil.	Oak land soil.	Buckshot soil.
	No. 217.	No. 219.	No. 228.	No. 230.		No. 419.	No. 422.	No. 420.	No. 423.
Insoluble matter.....	99.045	97.995	99.695	79.435	72.915	73.645	71.095	70.370	
Potash.....	0.152	0.132	0.183	0.398	0.454	0.758	0.711	0.854	
Soda.....	0.050	0.048	0.058	0.055	0.142	0.232	0.138	0.054	
Lime.....	0.235	0.054	0.221	0.067	0.403	0.655	0.641	0.901	
Magnesia.....	0.352	0.193	0.296	0.400	0.745	1.155	1.070	1.837	
Brown oxide of manganese.....	0.120	0.020	0.246	15.335	0.245	0.320	0.295	0.170	
Peroxide of iron.....	1.185	1.010	1.485		4.640	6.240	6.390	6.765	
Alumina.....	0.570	0.395	1.490		7.485	9.685	10.485	10.135	
Phosphoric acid.....	0.183	0.078	0.259	0.283	0.259	0.294	0.347	0.307	
Sulphuric acid.....			0.033	0.021	0.110	0.067	0.101	0.101	
Water and organic matter.....	6.243	1.233	4.825	4.013	12.728	6.590	9.319	9.527	
Total.....	99.135	101.158	99.791	100.007	100.126	99.650	100.592	101.131	
Hygroscopic moisture, air-dried....	2.300	0.650	2.065	4.950	8.750	8.475	8.950	9.475	

The black sandy soils contain over 90 per cent. of sand, and are black, with a large percentage of vegetable matter. They also contain fair percentages of potash and large proportions of lime and phosphoric acid, explaining their thriftiness under cultivation.

The heavy buckshot lands, with their large amounts of iron, alumina, and magnesia, have high percentages of potash, phosphoric acid, vegetable matter, and lime, and altogether show a high and lasting productive power under proper cultivation. The results of the analysis exhibit a remarkable agreement with those from other states, and add testimony to their being the richest lands of the river region.

**ARKANSAS RIVER BOTTOM LANDS.**—The bottom lands of the Arkansas river, from the line of the Indian territory to Little Rock, are usually narrow and irregularly distributed, though in places they afford large areas of tillable lands, the hills, through which the river has found its way, often approaching to near the water's edge. The lands embrace two terraces or bottoms, the first, or lowest, having a reddish, sandy, alluvial soil, timbered with cottonwood, maple, willows, etc., and mostly subject to overflows. The second bottom, about 15 feet higher, has soils of a dark sandy loam, timbered with red, pin, and chestnut oaks, black walnut, sweet gum, mulberry, and linden, with an undergrowth of papaw, sassafras, greenbriers, brambles, alder bushes, and grape-vines. This bottom is very productive, yielding from 1,500 to 2,000 pounds of seed-cotton or 50 bushels of corn per acre.

At Little Rock the river enters the sands, gravel, and clays of the southern pine-hills, and thence to its junction with the Mississippi river the bottom lands are mostly continuous on both sides of the river, covering in all about 1,200 square miles. On the south side the alluvial lands are comparatively narrow, the river sometimes flowing at the foot of the uplands; on the north they are very extensive, and, according to the correspondent from Prairie county, reach as far as bayou Meta, a distance in one place of about 30 miles. Below the mouth of the bayou the bottoms become more narrow, and the open prairies of the southern part of Arkansas county approach to within one mile of the river. The lands are well timbered with the growth already given, and comprise a red sandy, sometimes clayey loam—forming a front-land along the river, derived from the red sediment brought down during high water—and black sandy and black tenacious buckshot lands, forming the back-lands of the bottoms. The buckshot soils are, as in other bottoms described, usually wet and ill-drained, difficult to till, unless plowed before they become dry and hard, and are very productive. The region is interspersed with lakes, sloughs, and bayous, is largely subject to overflows, and levees have been constructed on portions of the river banks for protection. The lands are the chief cotton lands of this part of the state, and when under cultivation yield from 2,000 to 3,000 pounds of seed-cotton or from 50 to 70 bushels of corn per acre. The following analyses are given to show their composition:

No. 273. *Arkansas bottom waste land*, near Van Buren, Crawford county. Alluvium at the base of millstone grit. The dried soil is of a mouse-color, derived doubtless, in part, from the red sediment of the ferruginous shales of the Cherokee country.

No. 275. *Subsoil* from the same; dried, is a light-chocolate color.

No. 282. *Sandy loam*, Arkansas bottom land, near Van Buren, Crawford county. Millstone grit formation. The dried soil is of a brownish-umber color.

No. 284. *Subsoil* from the same. Dull light brick-dust color.

No. 385. *Bottom soil*, Sec. 10, T. 5, R. 18 west, Conway county. Timber growth, white, red, and black oaks, sweet gum, black hickory, and walnut; derived from millstone grit formation. The dried soil is of a light gray-brown color, and contains shot iron ore and fragments of deep ferruginous sandstone.

No. 387. *Subsoil* of the above. Gray buff colored.

No. 388. *Arkansas bottom land*, foot of Petit Jean mountain, Perry county. Nearest rock formation, millstone grit. The dried soil is of a gray-brown color, and contains much fine sand in clear grains.

No. 390. *Subsoil* of the above, taken 9 to 12 inches below the surface.

No. 424. *Soil* from a new field, Sec. 19, T. 5 S., R. 7 W., Jefferson county. Dried soil, mouse-colored, with a tint of umber.

No. 425. *Subsoil* from trench at the mill-seat near No. 424. Dried soil of a light brick-dust color.

No. 426. *Polished buckshot, or stiff red or chocolate-colored land*, from Sec. 9, T. 6 S., R. 7 W., Jefferson county (cuts like cheese or soap). The dried soil is of a powdered chocolate color, in very tenacious lumps.

No. 427. *Subsoil* of a stiff red or chocolate-colored land, three years in cultivation, near No. 426, Jefferson county. Dried soil like the preceding.

No. 428. *Black elm, ash, oak, and hickory land*, Sec. 20, T. 5 S., R. 7 W., Jefferson county. The dried soil is of a powdered chocolate color, having tenacious lumps.

No. 429. *Cotton soil* that polishes with the plow, taken 6 inches below the surface; same locality as No. 428, Jefferson county. Dried soil like the preceding.

No. 411. Sample of the so-called *buckshot land*, Sec. 16, T. 6 S., R. 6 W., Arkansas county. Timber growth, gum, hackberry, box-elder, etc. Dried soil, in very tough lumps, of a chocolate, dark-gray color. The infusion of the soil in carbonated water had a fetid smell, which was the case with some other soils of this kind.

No. 412. *Under or iron-shot clay*, taken from ravines at Arkansas Post, Arkansas county. It contains moderately friable rounded lumps of dark-brown oxide of iron, and is of a light-drab color.

No. 414. *Arkansas River bottom cotton soil*, T. 7, R. 4 W., Arkansas county. A sandy soil, containing minute specks of mica, of a warm brownish-gray color.

No. 416. *Subsoil* of above. Lighter colored, and not so sandy.

No. 333. *Bottom soil*, Moton's plantation, Arkansas county. The dried soil is of a light, dirty, brownish color.

*Arkansas river bottom lands.*

	NARROW LANDS ABOVE LITTLE ROCK.							
	CRAWFORD COUNTY.				CONWAY COUNTY.		PERRY COUNTY.	
	Waste alluvial land.		Sandy loam.		Sandy loam.		Sandy.	
	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.
	No. 273.	No. 275.	No. 282.	No. 284.	No. 383.	No. 387.	No. 388.	No. 390.
Insoluble matter.....	84.720	80.595	88.520	89.895	88.915	90.940	94.505	93.515
Potash.....	0.435	0.579	0.240	0.307	0.140	0.140	0.143	0.200
Soda.....	0.153	0.136	0.059	0.059	0.034	0.050	0.048	0.038
Lime.....	0.459	0.520	0.124	0.105	0.241	0.053	0.403	0.221
Magnesia.....	1.170	0.436	0.880	0.731	0.058	0.306	0.415	0.033
Brown oxide of manganese.....	0.145	11.363	0.095	0.220	0.245	0.220	0.080	0.120
Peroxide of iron.....	2.360		2.135	2.300	2.840	2.365	1.200	1.635
Alumina.....	2.515		1.690	3.090	2.310	3.985	1.435	0.610
Phosphoric acid.....	0.164	0.213	0.003	0.167	0.178	0.159	0.191	0.179
Sulphuric acid.....	0.050	0.052	0.033	0.024	0.067	0.045	0.036	0.041
Water and organic matter.....	7.830	6.582	4.791	2.467	4.505	2.050	1.747	2.050
Total.....	100.007	100.485	98.636	99.485	100.142	100.319	100.263	99.148
Hygroscopic moisture, air-dried.	3.975	4.525	2.425	1.725	2.900	2.000	1.250	2.050

	BROAD LANDS BELOW LITTLE ROCK.										
	JEFFERSON COUNTY.						ARKANSAS COUNTY.				
	Black sandy soil.	Clayey subsoil.	Red buckshot.		Stiff clayey soil.	Polished cotton soil.	Buckshot soil.	Under-clay.	Cotton.		Soil.
			Soil.	Subsoil.					Sandy soil.	Clayey subsoil.	
	No. 424.	No. 425.	No. 426.	No. 427.	No. 428.	No. 429.	No. 411.	No. 412.	No. 414.	No. 416.	No. 393.
Insoluble matter.....	85.545	85.745	71.980	71.165	70.240	78.000	75.740	86.815	93.415	81.240	78.305
Potash.....	0.502	0.441	0.898	1.013	0.941	0.710	0.642	0.212	0.201	0.714	0.352
Soda.....	0.111	0.107	0.149	0.175	0.125	0.147	0.204	0.153	0.100	0.080	0.083
Lime.....	1.257	0.105	0.760	0.753	0.559	0.013	0.941	0.203	0.212	0.543	0.823
Magnesia.....	0.929	1.100	2.871	2.513	2.577	1.292	2.301	0.876	0.737	1.555	0.845
Brown oxide of manganese.....	0.295	0.095	0.145	0.345	0.195	1.170	0.310	0.170	0.170	0.245	0.165
Peroxide of iron.....	1.940	3.400	5.065	7.000	6.815	4.015	5.750	3.515	1.740	4.640	9.000
Alumina.....	1.410	6.060	9.995	10.335	11.360	6.560	5.410	5.335	2.185	0.085	
Phosphoric acid.....	0.301	0.193	0.351	0.457	0.328	0.258	0.257	0.130	0.127	0.221	
Sulphuric acid.....	0.110	0.041	0.050	0.067	0.135	Not estim'd	0.101	0.041	0.050	0.084	0.250
Carbonic acid.....	0.988										0.067
Water and organic matter.....	6.568	2.384	7.379	5.511	7.879	6.750	7.880	2.470	1.893	5.091	9.342
Total.....	99.956	99.821	100.543	99.334	101.154	101.105	99.536	99.980	100.740	100.498	99.892
Hygroscopic moisture, air-dried.	3.325	3.550	7.850	8.350	8.435	5.200	8.000	4.250	1.550	4.025	5.375

Little Rock, which marks a point on the dividing line between the sandy pine-hills of the south and the rocky and red-loam lands of the north and west, is also about the point of separation between the sandy bottom lands of the upper portion of the river and the rich and broad lands of the lower. The lands above Little Rock are very generally the same in character throughout, the exception being in the "waste land" of Crawford county. Why this latter should be so called does not appear in Owen's report, as the soil is richer than the sandy loams in all the elements of fertility, and, unless unfavorably situated, is evidently more productive. The analysis of soil from an old field of the same thirty years in cultivation shows no material diminution, the elements being replaced probably either by subsoiling or by sediment from overflows. This waste land resembles very much the rich bottoms below Little Rock in its large amounts of potash, lime, and phosphoric acid. In the other sandy lands these elements are in fair amounts, except in that of Crawford, where the phosphoric acid is deficient.

The lands below Little Rock are among the richest in the state, and contain large percentages of potash, lime, magnesia, and phosphoric acid, the buckshot lands of Jefferson being especially rich in these as well as in vegetable matter, the latter doubtless rendering readily available much of the phosphoric acid. The magnesia, so abundant in all of the river soils, is probably derived chiefly from the magnesian limestones found along its banks and those of its tributaries in the Indian territory.

**THE LANDS OF WHITE RIVER AND ITS TRIBUTARIES.**—White river, in its course from Benton county, on the northwest, northward into Missouri, and thence southeastward to Jackson county, where it reaches the Crowley's Ridge region, has comparatively little bottom land. The stream has cut its way through and among the hills and mountains of the northern counties, and is bordered by upland valleys and sloping hillsides, or often by high and precipitous bluffs of limestone or sandstone. The lands of this part of the river are very fertile and productive when in sufficient tracts for cultivation. In Independence county, on the south side of the river, there is a large tract, known as the "oil-trough bottom", having a length of 15 miles, and bordered by high hills of limestone and sandstone, the principal timber growth of which is pin, red, and water oaks, elm, pecan, black walnut, sweet gum, hackberry, and buckeye, with an undergrowth of very large papaw, cane, grape-vines, and a little spicewood. The soil is a dark sandy loam, the subsoil being more tenacious, though black, to a depth of several feet. The land under cultivation is capable of yielding 50 bushels of corn or 30 bushels of wheat per acre.

From Jackson county southward to the junction with Arkansas river the bottom lands of the river vary in width from 1 mile to 5 miles or more, and lie apparently chiefly on the eastern side of the river, the western being bordered by the hills of Independence and White and the prairies of Prairie and Arkansas counties. The principal tributaries on the east are the Black and Cache rivers, lying parallel with each other, and separated by low sandy and gravelly ridges, 10 or 15 feet above overflow. The lands of White river are chiefly black sandy loams, well timbered with oak, ash, hickory, walnut, sweet gum, etc., and capable of yielding, when cultivated, from 1,200 to 1,500 pounds of seed-cotton or 50 bushels of corn per acre. These lands, however, are largely subject to overflow, and are interspersed with marshes and ponds.

South of the termination of Crowley's ridge, in Phillips county, there is a broad region of bottom land lying between the White and the Mississippi rivers, well timbered, and interspersed with lakes, sloughs, bayous, and a few low ridges, the latter above overflow. The lands comprise the black and light sandy loams of the ridge frontlands along the river and the stiff buckshot lands of the low bottoms.

**BLACK RIVER LANDS.**—Black river borders Crowley's ridge and the alluvial region on the west, its course from the Missouri line being slightly southwestward to its junction with White river at the right angle bend of that stream at Jacksonport. The alluvial lands proper, low and mostly subject to overflow, are interspersed with sloughs and lakes, and are well timbered with a large growth of white, red, black, and post oaks, gum, elm, hickory, and black walnut. Magnesian limestone hills and bluffs occur on the west of the river, while on the east the low ridges are formed of Quaternary deposits of sand, gravel, and clay. The soil is a black sandy loam, easily cultivated, and where above overflow has a yellow clay subsoil; it yields under cultivation from 50 to 70 bushels of corn per acre.

**CACHE RIVER LANDS.**—Cache river cuts a long groove, as it were, in the broad region of Crowley's ridge (on the west of the main ridge), extending from the Missouri line slightly southwestward to Clarendon, on White river, in Monroe county, a distance of more than 150 miles in a direct course, its broad bottom lands lying some 15 or 20 feet below the summits of the adjoining ridges, and having widths varying from 3 to 10 miles. This river runs parallel with White river, but has no "cut-off" connections with it. The lands embrace three chief varieties, viz: black sandy lands, post-oak lands, and black spice lands. The latter two are usually too wet for successful cultivation. The black spice lands support a timber growth of gum, ash, pin oak, and hackberry, besides the black spice. The growth of the black sandy lands is, as in the Saint Francis bottoms, sweet gum, hickory, walnut, poplar, dogwood, and hackberry, with an undergrowth of papaw and large grape-vines. These lands, when above overflow, are rich and productive, yielding under cultivation about a bale of cotton lint or from 50 to 70 bushels of corn per acre.

The following analyses are given of the lands of White river and its tributaries:

No. 244. *Oil-trough bottom soil*, Independence county. Timber growth, pin, red, and water oaks, elm, pecan, black walnut, sweet gum, hackberry, and buckeye, with an undergrowth of very large papaw, grape-vines, and a little spicewood. The dried soil is of an umber color.

No. 246. *Subsoil* of 244. Lighter colored.

No. 379. *White river bottom soil* near hills 1 mile above Batesville, Independence county. Growth, elm, hackberry, scaly-bark hickory, Spanish oak, walnut (near the river), and box-elder; nearest formation sub-Carboniferous. The dried soil is of an umber color, the lumps somewhat tenacious.

No. 381. *Subsoil* of the above. Lighter and more yellowish; lumps tenacious.

No. 382. *Bottom soil* close to river bank, 1 mile above Batesville, Independence county. Nearest formation is sub-Carboniferous. Dried soil is of a gray-umber color, more sandy and not so dark colored as preceding soil, and the lumps less tenacious. Effervesces slightly with acids.

No. 384. *Subsoil* near No. 382. Lighter and more yellowish; lumps very tenacious.

No. 324. *Black river bottom soil* near Parroquet bluff, Independence county. Dried soil is umber-gray in color, with some darker particles intermixed.

No. 436. *Clay soil* from what is called "buckshot land", low bottom, Sec. 6, T. 3 S., R. 5 E., Phillips county. Principal growth, cottonwood, sycamore, ash, elm, and mulberry; said to be the most productive land in the county. Dried soil is mouse-colored, in very tenacious lumps.

No. 438. *Subsoil* near No. 436. Ash-gray in color.

No. 439. *Sandy loam soil*, high (sugar-tree) ridge on Long lake, from same locality as No. 436, Phillips county. Growth, sweet gum, red elm, sugar-tree, hackberry, box-elder, white elm, large red oak, papaw, black walnut, sassafras, muscadine and other grape-vines; soil light-umber color when dry.

No. 441. *Subsoil* near the above. Lighter colored and yellowish.

No. 231. *Cache River bottom land*, black sandy soil, Jackson county. Growth, sweet gum and elm, with an undergrowth of slippery elm and dogwood.

No. 233. *Subsoil* near the above. Lighter colored and more yellowish.

No. 243. *Cache River swamp, post-oak and hickory soil*, Poinsett county. Dried soil is of a buff-gray color, and in a very fine state of division.

*Lands of White river and its tributaries.*

	INDEPENDENCE COUNTY.							PHILLIPS COUNTY.				JACKSON COUNTY.		Poinsett COUNTY.
	WHITE RIVER.						BLACK RIVER BOTTOM.	BUCKSHOT.		HIGH RIDGE.		CACHE RIVER.		CACHE RIVER.
	Oil trough.		Soil.	Subsoil.	Sandy soil.	Subsoil.	Soil.	Soil.	Subsoil.	Soil.	Subsoil.	Black soil.	Sandy subsoil.	Silty soil.
	Soil.	Subsoil.												
	No. 244.	No. 246.												
Insoluble matter.....	79.970	83.730	80.265	83.975	87.215	91.500	84.080	67.542	73.220	84.840	90.400	88.620	91.630	90.595
Potash.....	0.565	0.440	0.406	0.370	0.327	0.207	0.145	0.493	0.777	0.347	0.304	0.306	0.295	0.108
Soda.....	0.202	0.159	0.111	0.095	0.088	0.104	0.156	0.108	0.244	0.108	0.156	0.035	0.058	0.105
Lime.....	0.515	0.362	0.683	0.389	1.439	0.193	0.198	1.332	0.919	0.590	0.473	0.203	0.165	0.101
Magnesia.....	0.504	0.614	0.539	0.521	0.607	0.356	0.250	1.721	1.703	2.057	0.746	0.408	0.425	0.333
Brown oxide of manganese....	0.220	1.495	0.090	0.190	0.180	0.113	1.270	0.200	0.220	0.220	0.220	0.320	0.145	0.095
Peroxide of iron.....	3.385	3.310	3.140	4.350	2.490	2.115	6.140	5.485	6.840	2.065	2.710	1.865	2.005	3.290
Alumina.....	5.390	5.290	5.610	4.460	2.310	2.810	3.615	0.802	0.600	3.870	3.385	2.725	2.190	3.265
Phosphoric acid.....	0.232	0.222	0.373	0.298	0.193	0.209	0.282	0.303	0.314	0.297	0.259	0.204	0.192	0.104
Sulphuric acid.....	0.042	0.042	0.110	0.058	0.072	0.050	0.060	0.105	0.084	0.075	0.050	0.033	0.045	0.042
Carbonic acid.....					1.131			1.040	0.701	0.465	0.372			
Water and organic matter....	8.872	5.516	8.242	4.421	3.483	1.914	3.353	14.390	5.578	5.555	1.689	4.769	1.983	2.878
Total.....	90.897	101.180	99.569	99.133	99.595	99.663	99.555	99.587	100.200	101.389	100.704	99.628	99.193	100.016
Hygroscopic moisture, air- dried.	4.475	3.025	6.275	4.450	2.400	2.075	4.505	11.225	9.475	4.150	2.325	2.875	1.700	1.000

The richest lands of the above group are the buckshot clays of Phillips county, the clayey loams of Oil Trough bottom, and Nos. 379 and 381, all of which are rich in important elements and show high fertility and durability. The other bottom lands of Independence county, while rich in phosphoric acid, have small amounts of lime, the Black river soil being also low in potash. The sandy lands of the high ridge, and of Cache river, in Jackson, rank high in their potash and phosphoric acid percentages, but are low in lime, while the soil of Poinsett county is comparatively poor in all.

**BOTTOM LANDS OF THE OUACHITA RIVER AND ITS TRIBUTARIES.**—The bottom lands of the Ouachita river north of its junction with bayou Moro are extensive, and are heavily timbered with a growth of white and water oaks, large pines, beech, hickory, dogwood, and ash, and an undergrowth of cane. The soil is mostly a dark sandy loam, rich and very productive, and yields from 40 to 50 bushels of corn, or from 1,500 to 2,000 pounds of seed-cotton per acre. South of the mouth of bayou Moro the lands become broader and more subject to overflows. The first or low bottoms have in places a whitish clay soil, cold, wet, and slushy, with an abundant growth of palmetto, and overlie beds of lignite, which often outcrop on the banks of the river. The second bottoms or hummocks are usually dark and sandy, and are preferred for cultivation to either the uplands or low bottoms. They yield from 1,000 to 1,500 pounds of seed-cotton or from 30 to 35 bushels of corn per acre, and have a timber growth of hickory, pine, and oaks, and an undergrowth of witch-hazel and sumac.

The lands of Saline river are very similar to those of the Ouachita, and some of its bottoms are high and the soils more clayey than the hummocks, but yield under cultivation about the same. In Saline county, near the headwaters of the river, the lands embrace a first and second bottom, the soil of the latter being a dark sandy loam, timbered with large white, red, and black oaks, sweet and black gums, elm, hickory, and some sycamore.

The following analyses are given to show the composition of the lands of these streams:

No. 378. *Ouachita bottom soil* from Sec. 30, T. 12, R. 18, Ouachita county. Timber growth, white and water oaks, large pines, beech, hickory, dogwood, and ash; undergrowth, cane and yellow basswood. The soil is of a dirty-gray buff color.

No. 335. *Second-bottom soil* of the north fork of the Saline river, Sec. 16, T. 1 S., R. 15 W., Saline county. Timber growth, large red, white, and black oaks, sweet and black gums, elm, hickory, and some buttonwood. The dried soil is of a dark dirty-buff color.

No. 337. *Subsoil* of the same color as the soil, taken near the same place.

*Bottom lands of the Ouachita and Saline rivers.*

	OUACHITA COUNTY.	SALINE COUNTY.	
	OUACHITA RIVER.	SALINE RIVER.	
	Soil.	Soil.	Subsoil.
	No. 378.	No. 335.	No. 337.
Insoluble matter.....	80.040	85.940	89.990
Potash.....	0.207	0.309	0.212
Soda.....	0.078	0.076	0.073
Lime.....	0.067	0.246	0.092
Magnesia.....	0.519	0.817	0.462
Brown oxide of manganese.....	0.895	0.240	0.270
Peroxide of iron.....	3.415	2.490	5.265
Alumina.....	0.085	3.535	1.185
Phosphoric acid.....	0.282	0.163	0.182
Sulphuric acid.....	0.075	0.124	0.058
Water and organic matter.....	8.232	5.460	2.451
Total.....	99.905	99.400	100.240
Hygroscopic moisture, air-dried.....	4.650	3.850	2.100

These soils contain fair amounts of potash and phosphoric acid, though for river lands they fall far below the usual standard for other rivers of the state, resembling rather some of the upland soils. There is a great deficiency in lime in the Ouachita soil and the subsoil of Saline river, while the vegetable matter is present in fair quantities.

The soils of the two rivers cannot with these two analyses be properly compared with each other, for the reason that the Ouachita specimen was taken not very far from the junction of the two streams, while the Saline specimen came from the headwaters of that stream, in the region of the millstone grit and metamorphic rocks. The former would probably be a representative of the lower Saline river lands.

**RED RIVER BOTTOM LANDS.**—Red river, in its eastern course along the line of Texas and Arkansas, and thence southward into Louisiana, is bordered by wide and level bottom lands, interspersed with small lakes and sloughs and intersected by other streams, and covers a probable area of 560 square miles. These lands attain their greatest width of 10 to 15 miles within the bend of the river, in the northeastern part of Miller county, becoming narrower where the course of the river is regular.

The lands are mostly well timbered with pin, willow, and over-cup oaks, ash, walnut, pecan, gum, cottonwood, dogwood, cypress, and elm, and are often bordered by open black sandy prairies. One of these prairies, lying in the southern part of La Fayette county, is about 10 miles long and from 1 to 2 miles wide, and is bordered on the east by black hog-wallow lands. The river bottoms embrace two chief varieties of lands, a black sandy loam, occupying usually the second bottom or terrace, easily tilled, and yielding from 1,500 to 2,000 pounds of seed-cotton per acre, and a red, sticky clay, sandy in places, and probably the most prominent soil of the river. This soil is derived in part from the red sediment brought down by the waters of the river and in part from the red clay beds that are exposed in the banks, and is considered the richest land in the bottom. It is covered with a dense cane undergrowth, and when under cultivation is said to yield sometimes as much as two bales of cotton lint per acre.

The following analyses show the average composition of these bottom lands:

Nos. 329 and 331. *Black sandy prairie bottom soil and subsoil*, near Lanesport, Sevier county.

No. 332. *Red cotton land*, Red river bottom, near Lanesport, Sevier county. Produces best in dry seasons.

No. 357. *Genuine red or chocolate-colored, stiff cane, cotton*, Red river bottom land; edge of Lost prairie, but in timbered land, Miller county. This is one of the varieties of the celebrated cotton lands of the Red river bottom.

No. 359. *Subsoil* near the above, and lighter colored.

No. 354. *Black sandy soil* of Red river bottom, T. 14, R. 26, Miller county. Contains much fine sand.

No. 356. *Subsoil* taken near the above. Umber colored, lighter, and with a reddish tint.



## COTTON PRODUCTION IN ARKANSAS.

*Bottom lands of Red river.*

	SEVIER COUNTY.			MILLER COUNTY.			
	BOTTOM PRAIRIE LAND.		RED COTTON LANDS.	RED CANE AND COTTON LAND.		BLACK SANDY LAND.	
	Soil.	Subsoil.	Soil.	Soil.	Subsoil.	Soil.	Subsoil.
	No. 329.	No. 331.	No. 332.	No. 357.	No. 359.	No. 354.	No. 356.
Insoluble matter.....	84.540	89.040	78.290	74.740	70.415	93.990	93.090
Potash.....	0.413	0.352	0.679	0.057	0.520	0.214	0.164
Soda.....	0.077	0.088	0.132	0.191	0.155	0.053	0.062
Lime.....	0.669	0.185	2.682	2.542	2.248	0.120	0.004
Magnesia.....	0.601	0.024	0.685	2.830	2.209	0.463	0.056
Brown oxide of manganese.....	0.155	0.105	0.265	0.140	0.115	0.115	0.065
Peroxide of iron.....	2.090	2.340	10.940	4.990	4.715	1.340	1.540
Alumina.....	3.310	2.710		5.590	4.840	1.285	1.040
Phosphoric acid.....	0.130	0.256	0.163	0.182	0.162	0.176	0.120
Sulphuric acid.....	0.084	0.062	0.067	0.084	0.041	0.062	0.058
Carbonic acid.....	0.526		2.108	1.998	1.707		
Water and organic matter.....	0.027	3.631	4.016	0.587	3.289	2.300	1.822
Total.....	90.312	99.453	100.627	100.540	90.482	100.127	100.187
Hygroscopic moisture, air-dried.....	3.875	7.750	4.150	5.125	3.475	1.475	1.225

The red and stiff lands are seen by these analyses to be rich in the elements of fertility. The percentages of potash, lime, and magnesia are very high, while that of phosphoric acid is good, and sufficient for very many years' fertility.

The black bottom prairie lands rank next in fertility and in richness of soils. The percentages of potash, phosphoric acid, lime, and vegetable matter are good in the soil, and also, with the exception of lime, in the subsoil. The black sandy lands, while having an abundance of phosphoric acid and potash, are deficient in lime.

## CROWLEY'S RIDGE, OR POPLAR RIDGE LANDS EAST OF WHITE RIVER.

On the east of the White and Black rivers, which form a continuous water-course north and south from Missouri to the Arkansas river, there is a region of low ridges, flat lands, and small prairies, bordered on the east by a high and prominent ridge, known as Crowley's ridge, the summit being from 125 to 150 feet above the bottom lands. The region embraces the counties of Clay and Greene, the eastern half of Lawrence, the western halves of Craighead, Poinsett, Cross, Saint Francis, and Lee, and nearly all of Jackson, Woodruff, Monroe, and Phillips, with small areas in Randolph and in Prairie counties, covering in all about 5,250 square miles. A prominent feature is the wide prevalence of the tulip tree, popularly called poplar (*Liriodendron tulipifera*), and this is said to be the only region of the state where this tree is found growing.

Crowley's ridge proper forms at Chalk bluff, on Saint Francis river, in Clay county, on the Missouri line, a high bluff, a vertical section of which shows the following strata of Quaternary and Tertiary material below the soil and subsoil:

	Feet.
Chert and hornstone gravel.....	25
Pink and variegated sand locally indurated into a soft crumbling sandstone.....	96
White siliceous clay shale or marly earth.....	24
Fine white potters' clay to water's edge.....	6

Southward the ridge extends through the central parts of Greene, Craighead, Poinsett, Cross, Saint Francis, and Lee counties, reaches the Mississippi river at Helena, in Phillips county, and is there composed of the same materials. Its width varies from 1 to 6 miles, and is narrowest in Craighead county; it maintains about the same height throughout its length, but is broken into hills from the point where it touches the Saint Francis river in Cross county, southward to the Mississippi, and at Helena it slopes gradually to the river.

The following section is given from this latter point:

Yellow siliceous clay.....	feet..	6
Yellow and orange sand and gravel.....	feet..	20
Gravel.....	inches..	6
Reddish clay.....	feet..	9
Plastic clay (potters'), local.....	inches..	6
Yellowish and white sand, with some gravel.....	feet..	5
Sand and gravel.....	feet..	15
Space concealed to bed of slough.....	feet..	12



The summit of the ridge in the several counties is usually sandy and gravelly, with a large growth of tulip tree and beech, red, Spanish, and white oaks, hickory, sweet and black gums, black walnut, butternut, sugar-tree, honey-locust, and sometimes an undergrowth of cane. The lands are said to stand drought well, and to yield from 30 to 40 bushels of corn, 20 to 30 bushels of wheat, or 800 pounds of seed-cotton per acre.

In Phillips county the ridge spreads out into a comparatively level table-land, watered by Big creek, and has a deep-yellow or mulatto soil, with now and then small spots of an ashen color, probably the former beds of small dried up ponds. "The chief growth is sweet gum, but on the most elevated portion of this land, where the soil for analysis was collected, the growth is beech, tulip tree, red and white elm, mulberry, sweet gum, ash, white oak, black walnut, dogwood, sassafras, and red maple." This table-land is said to yield an average of 1,000 pounds of seed-cotton, 25 to 30 bushels of corn, or 20 bushels of wheat.

West of Crowley's ridge and the table-land to White river the country declines in elevation, and is composed of low ridges, with intervening white-clay flats, interspersed with occasional wet or glady prairies. The latter extend as far north as Craighead county, no mention being made of their occurrence in the counties of Greene and Clay. In the northeastern corner of Monroe county are Big and Little prairies. The latter appears to have been the bed of a dried up swamp. The soil and subsoil in this prairie are an ash-colored clay, charged with small iron gravel, having a depth of from 2 to 2½ feet, and resting on a substratum of red clay. These prairies require drainage for successful cultivation.

The country lying west of the ridge in Woodruff and the counties northward is not more than 10 or 15 feet above high water, and is much cut up by Cache river and many smaller streams. The low ridges are covered with sands and gravel, and are very similar in character and productiveness to the uplands already described.

The following analyses of the several varieties of land in this region are given :

No. 220. *Sandy soil* from the hickory and oak land of Crowley's ridge, Greene county. The dried soil is of a dirty-gray buff color.

No. 222. *Subsoil* of above.

No. 225. *Soil* from Sec. 11, T. 16, R. 4 E., Greene county.

No. 227. *Subsoil* of same, and buff-colored.

No. 445. *Hill land*, southern termination of Crowley's ridge, Phillips county. Derived from the clay and sand above the gravel bed. Principal growth, large poplar, beech, black walnut, white walnut, sweet gum, red, black, white, Spanish, and post oaks, and sugar tree. The soil is of a dark-drab color.

No. 447. *Subsoil* of the same. The dried soil is of a buff-gray or drab color; lighter than the preceding.

No. 442. *Table-land soil* from Sec. 5, T. 2 S., R. 4 E., Phillips county. Growth, beech, sweet and red gum, poplar, red oak, white and Spanish oaks, elm, ash, mulberry, black walnut, sassafras, red-bud, box-elder, honey-locust, and some black gum. It is at the foot of Crowley's ridge, and is derived from the Quaternary. The soil is of a dark ash-gray color.

No. 417. *Mamelle prairie soil*, edge of the "sunk land", Craighead county. Derived from the Quaternary. The dried soil is of a light-umber color, and contains small, clear, rounded grains of sand.

No. 433. *Little Prairie soil*, near Moreau post-office, Lee county. Growth, coarse grass, wild indigo, and sassafras shrubs in places. Dried soil is of an umber-gray color.

No. 434. *Subsoil* of the same. Dried; is ash-gray in color.

No. 435. *Red underclay*, from the same. Taken about 2½ feet below the surface.

No. 223. *Soil* from oak and pine ridge land 4 miles south of Gainesville, Greene county. Dried soil is of a buff-gray color.

No. 297. *Ridge soil*, Sec. 25, T. 1 N., R. 3 W., Monroe county. Growth, sweet gum, dogwood, and elm; some hickory and oak. Dried, is of a light-umber color; contains much fine, clear sand.

No. 430. *Ridge soil* from Sec. 11, T. 2 N., R. 1 E., Lee county. Growth, white, red, and post oaks, hickory, dogwood, black and sweet gum, and sassafras. Dried soil of a gray-buff color.

No. 449. *Ridge soil* from Governor Izzard's land, on the west side of Crowley's ridge, Saint Francis county. Growth, sweet gum, hickory, poplar, walnut, dogwood, red-bud, black ash, elm, muscadine, and other grape-vines. The dried soil is light mouse-colored.

No. 450. *Soil* of the same, cultivated thirty years.

No. 234. *Sandy soil* from 2 miles north of Jacksonport, Jackson county. Growth, black and white oaks; some hickory and sweet gum; Quaternary deposit. The dried soil is of a light-umber color.

No. 237. *Sandy soil*, Sec. 32, T. 14, R. 2 W., Jackson county. Growth, black and some white oaks, hickory, and sweet gum; Quaternary period. The dried soil is of a gray-brown color, and contains a large proportion of fine sand, composed of clear, rounded grains.

## COTTON PRODUCTION IN ARKANSAS.

*Lands of Crowley's Ridge region.*

	CROWLEY'S RIDGE LANDS.						TABLE- LANDS.	PRAIRIES.			
	GREENE COUNTY.				PHILLIPS COUNTY.		PHILLIPS- COUNTY.	CRAIGHEAD COUNTY.	LEE COUNTY.		
	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Soil.	Soil.	Subsoil.	Under clay.
	No. 220.	No. 222.	No. 225.	No. 227.	No. 445.	No. 447.	No. 442.	No. 417.	No. 433.	No. 434.	No. 435.
Insoluble matter .....	90.695	91.870	89.220	89.595	90.790	91.790	88.450	89.465	88.490	88.305	70.495
Potash .....	0.188	0.207	0.162	0.304	0.246	0.188	0.220	0.256	0.217	0.200	0.338
Soda .....	0.067	0.065	0.049	0.100	0.117	0.012	0.004	0.316	0.009	0.075	0.153
Lime .....	0.166	0.152	0.241	0.054	0.185	0.240	0.333	0.193	0.109	Trace.	0.081
Magnesia .....	0.325	0.412	0.490	0.537	0.618	0.357	0.350	0.504	1.263	0.504	2.335
Brown oxide of manganese .....	0.245	0.105	0.281	0.321	0.425	0.290	0.395	0.270	0.245	0.195	0.170
Peroxide of iron .....	1.660	1.900	1.650	2.085	1.950	2.290	1.640	2.370	2.405	2.700	5.815
Alumina .....	1.745	1.170	2.565	3.340	2.735	3.360	2.970	2.110	3.435	4.885	9.820
Phosphoric acid .....	0.259	0.117	0.111	0.341	0.242	0.193	0.444	0.161	0.165	0.129	0.251
Sulphuric acid .....	0.028	0.041	0.050	0.041	0.050	0.080	0.079	0.062	0.075	0.060	0.060
Water and organic matter .....	4.000	2.329	5.080	2.301	3.148	1.710	5.300	3.778	3.748	2.374	4.296
Total .....	99.378	98.518	99.899	99.019	100.506	100.528	100.104	99.475	100.281	99.607	99.814
Hygroscopic moisture, air-dried .....	1.725	1.275	2.365	1.815	2.175	2.000	3.425	2.725	3.300	3.125	5.750

	OTHER RIDGE LANDS.						
	GREENE COUNTY.	MONROE COUNTY.	LEE COUNTY.	SAINT FRANCIS COUNTY.		JACKSON COUNTY.	
	Soil.	Soil.	Soil.	Soil.	Soil cultivated 30 years.	Soil.	Soil.
	No. 223.	No. 297.	No. 480.	No. 449.	No. 450.	No. 234.	No. 237.
Insoluble matter .....	90.934	93.970	89.415	83.390	89.790	94.045	93.095
Potash .....	0.147	0.143	0.386	0.246	0.261	0.140	0.120
Soda .....	0.061	0.032	0.034	0.032	0.046	0.042	.....
Lime .....	0.120	0.081	0.125	0.753	0.253	0.109	0.138
Magnesia .....	0.205	0.266	0.831	0.494	0.532	0.308	0.665
Brown oxide of manganese .....	0.171	0.170	0.245	0.370	0.390	0.220	0.070
Peroxide of iron .....	1.610	1.100	1.965	2.125	2.340	1.100	1.305
Alumina .....	1.015	2.740	3.037	3.835	3.035	1.940	0.890
Phosphoric acid .....	0.112	0.090	0.221	0.535	0.210	0.004	0.110
Sulphuric acid .....	0.050	0.045	.....	0.084	0.067	0.033	0.022
Water and organic matter .....	5.464	2.193	3.463	8.555	3.619	1.796	1.093
Total .....	99.898	100.820	99.722	100.439	100.543	99.917	99.368
Hygroscopic moisture, air-dried .....	2.365	1.525	2.550	5.325	2.080	1.175	0.925

From these analyses it appears that there is comparatively little difference in the soils of Crowley's ridge and other ridges in the same localities, and that there is a very marked increase in richness in the lands of the southern part of the region over those of the northern. In the soils of Greene county (on the north) the analyses show a medium percentage of potash and a fair amount of phosphoric acid, except in No. 220, where it is much better. The lime is hardly sufficient to insure durability in the fertility of the soils. In Phillips county there is a large increase in the percentage of potash, the phosphoric acid also being large. The lime is insufficient, and an application of that element would doubtless prove beneficial.

The ridge lands of Lee and Saint Francis counties are well supplied with potash and phosphoric acid, the percentage of both phosphoric acid and lime being very high in the latter county, and resembling more the bottom lands of the river, if indeed it is not such. A soil (No. 450) from the same land under cultivation thirty years is seen by the analysis to have lost much of its phosphoric acid, lime, and vegetable matter, while the potash has remained about the same. Notwithstanding this diminution in important elements, the land was said to still yield a bale of cotton lint, 40 to 50 bushels of corn, or 15 bushels of wheat per acre.

The lands of the low ridges of Monroe county are very sandy and deficient in both phosphoric acid, vegetable matter, and lime, and have a fair amount of potash and magnesia. The table-lands of Phillips county produced by the flattening out of Crowley's ridge are very rich in phosphoric acid and vegetable matter, with a fair amount of potash and lime. The latter, however, is not sufficient for long continued thriftiness, and liming would soon have to be resorted to.

The prairie lands of both the north and south of the region have very nearly the same percentages of important elements, their differences being mostly in the amounts of soda and magnesia, the latter being very high in the soil from Lee county. This is also the case in the red underclay, though not in the subsoil. These prairies, with sufficient drainage and the application of lime, should produce fairly, as there are fair amounts of potash and phosphoric acid present for the needs of a crop.

The iron and alumina in all of the soils above analyzed are rather low, while the insoluble residue of sand is mostly high, thus indicating easy tillage. The magnesia is comparatively high throughout, and is no doubt derived from the large region of magnesian limestones in the adjoining portions of Arkansas and Missouri.

#### GRAY SILT PRAIRIES OF THE EAST.

The country lying in the sharp angle formed by the White river on the east and the bottom lands of the Arkansas river and bayou Meta on the west, the point of junction being on the southeast, is very generally an open prairie, its surface being slightly rolling, and drained by many small streams, which unite to form two larger ones flowing southward parallel with White river. The region embraces nearly the whole of Arkansas and Prairie counties and a large portion of the southern half of Lonoke, the northern limit passing 3 miles west and south of the county-seat of Lonoke and 2 miles south of Des Arc, the county-seat of Prairie county. On the east the prairies approach very nearly, if not immediately to, the banks of the White river, while on the south they are within 1 mile of the Arkansas river. The region embraces an area of about 1,535 square miles, and is dotted with small settlements, the average population being nearly twelve persons per square mile. The soil of the prairies is a sandy loam, with a depth of from 8 to 12 inches to a whitish and impervious clay subsoil, is ill-drained, and in low places is wet, spouty, and crawfishy; the higher portions are more sandy. In the northern part of the region the prairies are interspersed with timbered lands, underlaid by the material of the millstone-grit formation. The lands of the southern and greater part are underlaid by Tertiary clays, and probably by marls.

Going southward from this main region, we find occasionally small open prairies in Drew and Ashley counties, as well as still southward in Louisiana, on the same upland peninsula that is included between the Ouachita river and bayou Bartholomew, viz, prairies Mer Rouge and Jefferson. These prairies in the two states seem to be similar to each other, as well as to those of Arkansas and Prairie counties, with this exception: that those of Ashley and Drew are interspersed with small mound-like elevations, and are bordered with oak openings having the same feature. The lands of the latter prairies are usually flat and ill-drained, and are not as much in cultivation as those in Louisiana.

Crossing White river on the northeast side of the main prairie region we enter a region interspersed with bayous, small open prairies, and low ridges, which extends to Crowley's ridge, and is included in the description of Crowley's Ridge region. The prairies are usually flat, ill-drained, and wet, and not in cultivation. Little Prairie, in the western part of Lee county, appears to have been the bed of a dried-up swamp. The soil and subsoil are an ash-colored clay, charged with small iron gravel, having a depth of 2 to 2½ feet, and resting on a substratum of red clay. The northern limit of these prairies, as far as reported, is in Craighead county, and, as on the south, is composed of Quaternary clays and sand, forming a loamy soil with an impervious clay subsoil, wet and ill-drained, and not in cultivation.

The following analyses show the average composition of these prairie lands:

No. 321. *Soil of Grand Prairie*, 7 miles east of Brownsville, Prairie county. Millstone-grit formation, locally covered with Quaternary. Soil is of a light-umber color.

No. 323. *Subsoil* taken near the above.

No. 406. *Soil of the prairie* adjoining the Spanish grant on Sec. 18, T. 7 S., R. 3 W. An average of the prairie land of Arkansas county. Dried soil is of a light-umber color.

No. 408. *Subsoil* of the above.

No. 409. *Prairie soil* from the highest of the prairie, on Sec. 17, T. 7 S., R. 3 W., Arkansas county. Drier and looser than No. 406.

No. 410. *Upland woodland soil* adjoining the prairie land of the Spanish grant, T. 7 S. R. 4 W., Arkansas county.

No. 412. *Under (or iron-shot) clay* taken from ravines washed out at Arkansas Post, Arkansas county. This kind of clay underlies the prairie soil near Arkansas Post.

## COTTON PRODUCTION IN ARKANSAS.

*Gray silt prairie lands.*

	PRAIRIE COUNTY.		ARKANSAS COUNTY.				
	GRAND PRAIRIE.		PRAIRIE.		HIGH PRAIRIE.	WOODLAND.	PRAIRIE.
	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Soil.	Underclay.
	No. 321.	No. 323.	No. 406.	No. 408.	No. 409.	No. 410.	No. 412.
Insoluble matter.....	90.020	92.330	88.465	86.400	88.805	87.905	80.815
Potash.....	0.053	0.127	0.183	0.160	0.103	0.174	0.212
Soda.....	0.035	0.026	0.050	0.044	0.072	0.053	0.153
Lime.....	0.026	0.026	0.053	0.053	0.081	0.067	0.203
Magnesia.....	0.280	0.265	0.482	0.520	0.475	0.519	0.876
Brown oxide of manganese.....	0.295	0.195	0.245	0.345	0.226	0.260	0.179
Peroxide of iron.....	1.665	2.015	2.740	3.965	2.140	3.015	3.515
Alumina.....	1.725	1.515	2.535	4.910	2.600	3.685	5.335
Phosphoric acid.....	0.146	0.128	0.212	0.118	0.163	0.173	0.130
Sulphuric acid.....	0.055	0.041	0.071	0.067	0.101	0.067	0.041
Water and organic matter.....	4.653	2.138	4.094	3.506	4.998	3.814	2.470
Total.....	98.953	98.806	99.180	100.163	99.878	99.742	99.980
Hygroscopic moisture, air-dried.....	3.300	1.825	3.690	3.750	3.950	3.300	4.250

These analyses show low percentages of potash in all of the soils and subsoils, with a deficiency in the Grand Prairie soil. The proportions of phosphoric acid, magnesia, and organic matter are fair, but the lime is extremely deficient. The underclay, No. 412, would apparently be of little advantage to the soil if commingled with it, as it contains less phosphoric acid, though more potash and lime than the latter.

The soil of Grand prairie is said to produce from 20 to 30 bushels of corn, or 30 bushels of wheat per acre.

Comparing these prairies with those of Crowley's Ridge region, on page 22, we find them to have larger percentages of potash, magnesia, and lime, with about the same percentage of phosphoric acid.

For comparison with the soil of prairie Mer Rouge, of Morehouse parish, Louisiana, the characteristic soils of the three groups are placed together.

	LEE COUNTY.		ARKANSAS COUNTY.		MOREHOUSE PARISH, LOUISIANA.	
	LITTLE PRAIRIE, OF CROWLEY'S RIDGE.		GRAY SILT PRAIRIE.		PRAIRIE MER ROUGE.	
	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.
	No. 433.	No. 434.	No. 406.	No. 408.	No. 234.	No. 235.
Insoluble matter.....	88.490	88.395	88.465	86.400	93.196	94.086
Potash.....	0.217	0.290	0.183	0.169	0.131	0.155
Soda.....	0.060	0.075	0.050	0.044	0.060	0.085
Lime.....	0.169	Trace.	0.053	0.053	0.155	0.127
Magnesia.....	1.263	0.504	0.482	0.526	0.070	0.238
Brown oxide of manganese.....	0.245	0.195	0.245	0.345	0.066	0.135
Peroxide of iron.....	2.465	2.790	2.740	3.965	1.370	1.731
Alumina.....	3.435	4.885	2.535	4.910	1.080	1.708
Phosphoric acid.....	0.165	0.129	0.212	0.118	0.178	0.093
Sulphuric acid.....	0.075	0.060	0.071	0.067	0.061	0.210
Water and organic matter.....	3.748	2.374	4.094	3.506	3.297	1.606
Total.....	100.281	99.097	99.180	100.163	99.670	100.264

The following conclusions may be reached from this comparison :

The subsoil in each region is poorer, though more clayey than the soil.

The lands of prairie Mer Rouge are more sandy and less ferruginous than those of the other prairies.

There is a decrease in the percentage of potash in the prairies from Craighead county southward into Louisiana.

The percentages of phosphoric acid and organic matter are about the same throughout, the highest being in Arkansas county.

### YELLOW LOAM, OR OAK, HICKORY, AND SHORT-LEAF PINE UPLANDS.

The large region thus designated occupies the larger part of the southern portion of the state, and is the continuation northward of the similar regions in Texas and Louisiana. It embraces in Arkansas all or parts of twenty counties, viz: all of Ashley, Union, Columbia, La Fayette, Miller, southern part of Hempstead; nearly all of Nevada; all of Ouachita, Calhoun, Bradley, Drew, Lincoln, Dorsey, Dallas; the southern part of Clark; the

southeastern part of Hot Spring; all of Grant; all of Jefferson, except the alluvial of the Arkansas river; and a small part of Saline and Pulaski counties, covering in all about 12,720 square miles. The high uplands of Little River, the northern part of Hempstead, the middle of Clark, and of the southern part of Sevier and Howard, lying above the black prairies, belong also properly to this region. It is bordered on the east by the alluvial lands of the Mississippi and the Arkansas rivers, and on the north by the red-loam lands of central Arkansas. In its western part the ridges are interspersed with small black prairie lowlands of the Cretaceous formation; the rest of the region covers the Tertiary.

The surface of the country is usually rolling and hilly, most so toward the north, where the hills are from 100 to 150 feet above the streams, that of the south being more level and undulating, especially along the Louisiana line. It is generally well timbered with short-leaf pine, red, post, white, and black oaks, hickory, dogwood, holly, and beech. The latter growth, said by Dr. Owen not to occur north of this region, is first seen below Rockport, on the banks of the Ouachita river, and southward becomes more and more common, till it is the prevailing growth, or even covers by itself alone low hills of the Tertiary or Cretaceous formations. The region is well watered by many streams flowing southward. Of these, Red river on the west, Ouachita and Saline in the center, and bayou Bartholomew on the east are most important, the Ouachita, with its tributaries, draining the greater part. The lands are underlaid chiefly by the clays, gravel beds, etc., of the Quaternary and Tertiary periods, while ferruginous sandstones, conglomerates, and iron ores cap many of the hills in the northern counties of the region. Gravel beds are very extensive, the stones varying from a few ounces to as much as 20 pounds in weight. Tertiary limestone underlies the lands in Clark, Dallas, and Grant counties, and beds of gypseous marls are reported in the southwest part of Bradley. In the southern counties bordering the Ouachita river thick beds of lignite are found at depths of from 15 to 30 feet.

This yellow-loam region is not as thickly settled as others in the state, though the average is nearly fifteen persons per square mile. The greatest average is found in the counties of Hempstead, Jefferson, and Nevada, the first and last having also the greatest average acreage of tilled lands. A little more than one-tenth of the area of the region is under cultivation, a proportion about equal to that of the other regions of the state. The chief crops comprise cotton, corn, wheat, oats, and sweet potatoes. Cotton has the largest acreage. The corn produced in 1879 would average about 18.6 bushels per inhabitant: an amount not nearly sufficient for the full supply for man and working stock.

The lands of the region derived from or made up of such a variety of material are themselves naturally varied in character and composition, without any regular relationship with reference to each other. They occur in small and large tracts, and may, in general, be classed as red lands, gray sandy loams, prairies, and flats.

**RED LANDS.**—The largest and most prominent of occurrences of the red lands of this region are in the counties of Grant, Dallas, Bradley, Dorsey, Calhoun, and Ouachita, with smaller areas elsewhere. These lands are either the clay subsoils which underlie a great part of the sandy soils of the region and here approach to the surface, or are sandy in character, and derived from the ferruginous sandstones, limonite, or other forms of Tertiary iron ore that occur in the hills or on their summits. Occasionally the commingling of the red clays with sands from the hillsides produces a chocolate-colored or mulatto loam, easier to till, and often as productive as the former.

The red clay that borders the Red river bottom in La Fayette and Miller counties, as well as that found in other counties, has a deep red color, and is said to be suitable for paint, if well washed.

The timber growth is generally elm, mulberry, prickly ash, red oak, and a few white oaks and hickory, with an undergrowth of dogwood, muscadine and other grape-vines in great abundance. The lands are said to produce an average of from 800 to 1,000 pounds of seed-cotton, 40 bushels of corn, or 15 bushels of wheat per acre.

The following analysis gives the composition of perhaps a fair sample of these lands:

No. 375. *Genuine red soil* from the northeast corner of Sec. 4, T. 11, R. 11, in the southern part of Dorsey county. The dried soil is of a reddish chocolate-brown color.

*Red lands soil of Dorsey county.*

	No. 375.
Insoluble matter.....	69.690
Potash.....	0.328
Soda.....	Not det'd.
Lime.....	0.235
Magnesia.....	0.413
Brown oxide of manganese.....	0.743
Peroxide of iron.....	15.950
Alumina.....	5.985
Phosphoric acid.....	0.331
Sulphuric acid.....	0.075
Water and organic matter.....	6.806
Total.....	100.567
Hygroscopic moisture.....	4.500

## COTTON PRODUCTION IN ARKANSAS.

This analysis shows the presence of very high percentages of iron and manganese and a fair one of alumina. The phosphoric acid percentage is high, with scarcely enough lime to render it fully available. Its thriftiness would be greatly increased and tillage improved by the addition of the latter. There are fair amounts of potash and magnesia present, and apparently of organic matter.

**GRAY SANDY LANDS.**—The greater part of the yellow-loam region is covered with a sandy soil, often very gravelly, timbered with a growth of oak, hickory, and short-leaf pine, the latter being very prominent and characteristic of these lands. This is especially the case as regards the higher uplands, which are frequently known as pine hills. The subsoils vary in character from a yellowish to a deep-red clay, more or less impervious, and at depths of from 6 to 12 or 18 inches below the surface. In the hilly lands of the northern counties of the region the red-clay subsoils are most prominent, being exposed in ditches and on the roadside, as well as forming large areas of red lands by the removal of the sandy soil by denudation.

In the southern counties the subsoils seem more generally to be a yellowish sand or clay, and the lands are about as productive as the others, yielding from 600 to 800 pounds of seed-cotton, 25 bushels of corn, or 15 bushels of wheat to the acre when in cultivation. Both are easily tilled and generally well drained.

The following analyses are given to show the composition of these soils:

No. 348. *Sandy soil*, taken near Lisbon, northwestern part of Union county. The dried soil is ash-gray or umber-gray colored. It contains much sand and some rounded quartzose pebbles.

No. 350. *Subsoil* from the same locality, taken at 10 inches depth from the surface. Contains some rounded quartzose pebbles.

No. 369. *Sandy soil* from E. T. Franklin's yard, Sec. 22, T. 12, R. 10, 2½ miles northwest of Warren, Bradley county. The dried soil is of a dirty yellowish-gray color. Rounded quartz pebbles of various sizes were sifted out of it by the coarse sieve, of 150 apertures to the inch.

*Gray sandy uplands, or pine-hill soils.*

	UNION COUNTY.		BRADLEY COUNTY.
	Soil.	Subsoil.	Soil.
	No. 348.	No. 350.	No. 369.
Insoluble matter .....	95.890	92.115	90.805
Potash.....	0.029	0.096	0.121
Soda.....	0.095	0.026	0.006
Lime.....	0.012	0.039	0.218
Magnesia.....	0.301	0.893	0.408
Brown oxide of manganese.....	0.140	0.165	0.165
Peroxide of iron.....	0.965	1.865	2.740
Alumina.....	0.285	2.935	2.480
Phosphoric acid.....	0.052	0.062	0.095
Sulphuric acid.....	0.027	0.033	0.041
Carbonic acid.....			
Water and organic matter.....	1.893	1.674	3.207
Total .....	99.689	99.903	99.853
Hygroscopic moisture, air-dried .....	0.950	1.425	2.085

The above sample of soil from Union county may, from its analysis, be said to be poor in everything except sand, magnesia, and manganese. The essential elements of fertility are lacking both in the soil and subsoil. The soil from Bradley county is somewhat better, though still deficient in potash and phosphoric acid. The effect of a greater percentage of iron and of alumina is seen in the increased moisture coefficient. These soils, though producing a fair crop when fresh, would soon fail, and if they were not supported by a good subsoil would need the aid of fertilizers for productiveness.

**PINE FLATS, GLADY LANDS, AND OAK FLATS.**—Along the borders of the creek and river bottoms in a number of the counties, especially on the south, there frequently occur low and flat lands, wet and glady in character, and considered of no value agriculturally, the soil of which is generally a white siliceous clay, impervious and ill-drained. These localities are timbered with an almost exclusive pine or oak growth, sometimes associated with other trees, and seem to be similar in many respects to the clay flats occurring in the region between the White river and Crowley's ridge, on the east, in Phillips, Monroe, and other counties.

In Union county and the southern part of Calhoun there are tracts of the glady pine flats, with crawfishy, white clay soils, an analysis of which is given below. In Columbia county, along bayou Dorchite, these flats have an oak growth, the soil being apparently the same in character. They are bordered by sandy land, elevated but a few feet above high water. On Big creek flats, in the same county, the soil is a white clay with a growth of pine,

holly, and beech. The flats of Ouachita county, with their wet pipe-clay soil, when properly drained, have yielded under cultivation as much as 1,200 pounds of seed-cotton per acre. In wet seasons neither cotton nor corn yield good crops.

No. 340. *Camp creek glady soil*, near Lisbon, Union county. The dried soil is mouse-colored. When calcined and the organic matter is burnt out, it is of a light-gray color, indicating the almost entire absence of oxide of iron.

*Glady pine flat lands of Union county.*

	Soil.
	No. 340.
Insoluble matter.....	90.715
Potash.....	0.035
Soda.....	0.036
Lime.....	0.078
Magnesia.....	0.208
Brown oxide of manganese.....	Trace.
Peroxide of iron.....	Trace.
Alumina.....	3.735
Phosphoric acid.....	0.096
Sulphuric acid.....	0.062
Water and organic matter.....	6.618
Total.....	101.583
Hygroscopic moisture, air-dried.....	3.075

This soil is deficient in every element of fertility except organic matter and magnesia. Even for the small percentage of phosphoric acid present there is not sufficient lime to render it available. The analysis shows that the native resources of the land are not such as to invite its reclamation.

**PRAIRIES.**—In the counties of Ashley, Drew, and Lincoln, especially in the former two, some prairies are found interspersed throughout the uplands, producing a feature different from the rest of the yellow-loam region. These prairies are usually small and open, and appear to be but a continuation southward of the prairies lying between the Arkansas and White rivers and along the western border of Crowley's ridge, still northward on the east of White river. They seem also to correspond to the lowland prairies of Dubute, Seymore, Mer Rouge, and Jefferson, immediately south, in Louisiana, though differing somewhat in character. These prairies in Arkansas are very level, and are usually bordered on all sides by a scattering growth of post oak, known as oak openings. Their elevation is probably not more than 12 or 15 feet above the water-level of the streams, at which depth water is obtained in wells. Their surface, as well as that of the oak openings, is dotted over with small mound-like elevations. The soil is a "close-textured siliceous clay", underlaid by an impervious clay, and consequently the land is ill-drained and not much in cultivation. Sand is said to underlie the prairies at a reasonable depth for successful ditching, which would probably render these soils fairly productive.

**BLACK PRAIRIES OF THE SOUTHWEST.**—A region of black prairies occurs in the southwestern part of the state, with a width of about 30 miles, from Red river, northward on the line of the Indian territory, to Ultima Thule, about half way through Sevier county. Eastward the region becomes more and more narrow, until it culminates in a point at Arkadelphia, on the Ouachita river, in Clark county, and embraces the county of Little River, half of Sevier and Howard, and a small part of Pike, the northern part of Hempstead, the northwestern corner of Nevada, and the central part of Clark, an area of about 1,950 square miles. The region may be considered as the initial point of that great black prairie region that, passing into the southern part of the Indian territory, and turning southwestward through Texas to San Antonio and westward to the foot of the table-lands (if not including also these and the Llano Estacado again northward), forms one of the most prominent and most important topographical and agricultural features of that country.

In Arkansas, as well as in the eastern part of the Indian territory, the region is represented, not, as in Texas, by large and continuous prairies, open and almost entirely without timber growth, but by very small prairies (if, indeed, they can be called such), occupying the lowlands along the borders of the creek bottoms and lying at the foot of the sandy pine ridges that form the water divide of all the streams of the region. These lowlands usually have a more or less abundant timber growth of bois d'arc (also called Osage orange), haw, hickory, and sumac, and an undergrowth of scrubby swamp dogwood, indicating the low character of the land. The bois d'arc seems to be the characteristic growth of the black prairies, both in this state and in northeastern Texas (as observed near Clarksville), "attaining considerable size, and flourishing everywhere, even on the bare Cretaceous beds."

This region is underlaid throughout by the Cretaceous formation, the scattered prairies resting directly upon its beds of limestone, marls, and clays, while the ridges are composed of later material. These marls and limestones contain large percentages of carbonate of lime, which give to the prairie lands a highly calcareous character.

In Sevier county salt-licks and flats occur in the vicinity of Graham. The black lands of this region are more or less clayey in character, usually calcareous, and are very productive, and are said to yield from 35 to 50 bushels of corn, 20 bushels of wheat, or from 1,000 to 1,500 pounds of seed-cotton per acre.

The black sandy lands of Red river, though overlying Cretaceous beds, are not properly Cretaceous soils, as they differ very materially in composition, and especially in that they contain but a small percentage of lime. Prairies of this character occur on the borders of the bottom lands, and are described elsewhere as bottom prairies of Red river. The following analyses are given of these soils:

No. 341. *Genuine black sticky, waxy soil*, taken from Sec. 19, T. 8, R. 19, Clark county. Timber growth, sweet gum, mulberry, and walnut.

No. 343. *Genuine Cretaceous soil*. Sec. 28, T. 17, R. 20, collected adjacent to a marl bluff on Decipher creek, Clark county. Growth, gum, hickory, pin and Spanish oaks, ash and sea-ash.

No. 326. *Soil* from Sec. 7, T. 11, R. 25, Hempstead county. Usually limited prairies, surrounded with pine, hickory, ash, and bois d'arc (Osage orange). Undergrowth, spice bush, papaw, swamp dogwood, and buckeye; overlies marly limestone.

No. 328. *Subsoil*, taken near the same. Mostly disintegrated shell marl with vegetable matter. Its soil contained much limestone in fragments.

No. 339. *Genuine Cretaceous soil* from Sec. 2, Fr. T. 10, R. 30 W., west part of Sevier county.

No. 366. *Black soil* from Sec. 12, T. 13, R. 32, Sevier county. Timber growth, hickory, scrub haw, and Osage orange; undergrowth, swamp scrub dogwood. It contains small whitish particles, which decrepitate when the soil is heated.

No. 368. *Subsoil*, taken near the above.

No. 372. *Soil* from Sec. 4, T. 8, R. 26, on a branch of Bacon creek, Pike county, over the Cretaceous formation, with small spiral shells. Principal growth, white oak; some large rounded quartzose pebbles were removed from the soil.

No. 374. *Pebbly subsoil* from near the same place.

*Lands of the black calcareous prairies.*

	CLARK COUNTY.		HEMPSTEAD COUNTY.		SEVIER COUNTY.			PIKE COUNTY.	
	Waxy soil.	Soil.	Soil.	Subsoil.	Soil.	Soil.	Subsoil.	Soil.	Subsoil.
	No. 341.	No. 343.	No. 326.	No. 328.	No. 339.	No. 366.	No. 368.	No. 372.	No. 374.
Insoluble matter.....	68.315	64.015	77.740	35.140	73.115	37.999	10.915	85.915	92.705
Potash.....	0.563	0.351	0.314	0.314	0.432	0.362	0.196	0.155	0.120
Soda.....	0.111	0.090	0.015	0.095	0.125	0.146	0.069	0.035	0.067
Lime.....	1.478	1.890	1.352	28.134	1.088	20.389	44.385	0.300	0.056
Magnesia.....	1.737	1.044	1.142	1.313	0.490	2.279	0.702	0.502	0.283
Brown oxide of manganese.....	0.370	0.545	0.290	0.240	0.251	0.200	0.140	0.205	0.370
Peroxide of iron.....	6.359	5.015	4.235	2.585	5.780	4.415	1.015	1.495	2.015
Alumina.....	12.910	8.935	8.235	5.235	9.927	6.165	2.740	2.785	2.569
Phosphoric acid.....	0.302	0.165	0.101	0.087	0.262	0.368	0.112	0.103	0.115
Sulphuric acid.....	0.075	0.144	0.067	0.096	0.077	0.247	0.118	0.092	0.041
Carbonic acid.....	1.162	1.485	1.083	22.106	0.852	16.021	34.875	.....	.....
Water and organic matter.....	8.216	16.352	5.387	5.588	9.213	12.005	4.579	8.446	1.775
Total.....	101.589	100.031	100.031	100.878	99.612	100.677	100.415	100.253	100.167
Hygroscopic moisture, air-dried.....	11.650	11.020	4.875	4.800	7.475	9.675	2.775	4.100	1.425

These analyses show the presence of an abundance of potash, magnesia, and lime in all of the soils except from Pike county, while the phosphoric acid is high in Nos. 341 and 366, with fair percentages in the others. The subsoil No. 368 is but little else than impure carbonate of lime, Nos. 328 and 366 also having very high percentages.

The soil from Pike county, while overlying limestone, is sandy and has but comparatively little lime. Its vegetable matter is high.

THE CENTRAL RED LOAM, OR SHALE AND SANDSTONE REGION.

The region thus designated has a greater extent of territory than any other region of the state. It occupies a central north and south position, and its boundaries may be in general marked by the following outlines: From the line of the Indian territory, on the west, eastward through the middle of Sevier and Howard counties, the south of Pike, and thence quite direct to Little Rock, on the Arkansas river; and to a point on White river two miles south of Des Arc, in the northern part of Prairie county. This line also marks the northern limit of the black prairies, sandy pine-hills, and the large prairie silt region between the two rivers mentioned. From Des Arc to



Jacksonport, in Jackson county, White river forms the eastern border of the region, separating it from the lowlands of Crowley's ridge. From Jacksonport westward its northern limit passes through the southern portions of Independence, Stone, Searcy, and Newton and the middle of Madison counties, and northward through the eastern part of Benton county to the line of Missouri. The region embraces altogether seventeen entire and parts of fourteen counties, and covers about 15,680 square miles. The Arkansas river divides the region into two unequal portions, its basin draining the greater area on either side. On the northwest the headwaters of White river flow northward, and the northeast tributaries of the same flow eastward, while the southern part of the region is drained by the heads of the Ouachita and tributaries of the Red river.

The general surface of the country is hilly and broken, with high and prominent mountain ridges from 500 to 1,000 feet above the general level. It is generally well timbered, with the exception of a large region of prairies in the counties of Sebastian, Scott, Logan, and Yell, and in Washington and Benton on the northwest, and its lands are derived almost exclusively from the sandstones, shales, etc., of the Carboniferous formation, the shales usually underlying the prairies in the southern part of the region. There are areas of granite and other metamorphic rocks, forming, where extensive, lands different in character from those of the main region.

The following agricultural divisions are recognized in the region, and will be considered separately:

1. The gray and red-loam timbered region.
2. The central and western red-loam prairies.
3. Northwestern red-loam prairies.
4. The granitic or metamorphic region.

This region is more thickly populated than any other in the state, the average being a little more than seventeen persons per square mile. Pulaski and Sebastian counties, in which are located Little Rock and Fort Smith, are naturally at the head of the list, Crawford and Washington being next. The lands under cultivation comprise 10.5 per cent. of the entire area, with an average of 67.5 acres per square mile. In Washington, Benton, and Sebastian counties this acreage is nearly doubled, and in Logan and Conway it is respectively 98 and 96 acres per square mile. Benton county, on the northwest, has a maximum of 126 acres per square mile, and is thus at the head of all of the counties of the state in this regard, while at the same time it is lowest in acreage devoted to the culture of cotton. The counties of Montgomery, Polk, Garland, Perry, Scott, and Van Buren have the smallest percentage of tilled lands in the region.

The chief crops of the region are corn, cotton, wheat, oats, and sweet potatoes. The acreage of cotton was 22.1 per cent. of the lands under cultivation, or an average of 14.9 acres per square mile. A little more than half a bale of lint, or 870 pounds of seed-cotton, was produced per acre in 1879. The acreage of corn was the greatest, comprising 40.6 per cent. of the tilled lands, or about 27.4 acres per square mile. The yield for 1879, 9,398,210 bushels, was an average of 8.3 bushels per acre, or 32.4 bushels per capita.

#### GRAY AND RED LOAM TIMBERED REGION.

The two parts of this region lying on either side of the Arkansas river differ from each other to some extent in their topographical and lithological features, though both belong to the same geological formation. These differences are produced by the general dip of the rock strata toward the south, where the sandstone, shales, etc., have a great thickness, causing a gradual thinning out on the north and the bringing up of the limestones of the lower formation, whose material enters more or less into the composition of the soils. This is especially the case in Washington, Crawford, and Franklin counties, the other counties resembling those on the south of the river. Taking the Arkansas river as a line of division, the two parts will, for convenience, be described separately.

**COUNTRY SOUTH OF THE ARKANSAS RIVER.**—The general character of this country is that of a rolling and broken region, having hills and ridges ranging from 350 to 600 feet high, and a few mountain chains having elevations of from 1,000 to 1,400 feet above the surrounding valleys, with trends nearly east and west.

The surface of the country on the southwest, in the counties of Sevier and Howard, is more level than in the other counties, and gradually rises northward to the foot of the Cossatot range, near Dallas, in Polk county. Its sandstones and shales are, to some extent, metamorphosed under the influence of the same causes that have produced the granites and metamorphic rocks of Saline, Pulaski, Hot Spring, and other counties, and mineral veins are said to exist in several localities. In Pike, Montgomery, and counties eastward the surface of the country is very hilly and broken, with high ridges of sandstone, which rock is sometimes changed into novaculite or is studded with magnificent quartz crystals.

The Cossatot mountain range, passing east and west through the central part of Polk county near Dallas, has an elevation of about 1,000 feet, and is composed of the upturned and broken strata of sandstone and shales. The next range of mountains on the north is the Fourche La Pave, whose summit, 1,000 feet above the valley, forms the line between Polk and Scott counties. Its trend is irregularly east and west to the edge of Montgomery county, when it turns slightly northeastward into Yell, in which county its height is said to be 800 feet.

In Sebastian county there are a number of high ridges and mountain peaks, that of Sugar Loaf having an elevation of from 1,200 to 1,400 feet.

The Petit Jean mountain, in the northern part of Perry county, has an elevation of from 450 to 500 feet, which gradually declines to the westward, until it loses itself as a conspicuous landmark near the confines of Perry and Yell, and a gradual improvement is visible in the soil of the country. The Magazine mountains lie still northward of these, forming a prominent range, which terminates in a headland on the Arkansas river near the town of Dardanelle.

These ranges of mountains are composed almost entirely of sandstones and shales, the former usually forming the summit, one of its beds appearing as a prominent escarpment, running like a battlement along the brow of the mountain. Some of these mountains and high ridges have a timber growth of pine, oak, and hickory, indicating loose sandy and unproductive soils, such as would result from the disintegration of the sandstones.

The lands of this region, derived from the sandstones and shales, vary in character as these materials are commingled, and may in general be classed as gray sandy soils and reddish loams or clay soils.

The gray sandy lands, occurring usually on the table-lands or at the foot of the sandstone ridges, are loose and easily tilled, and at a depth of a few inches (when in the valleys) are underlaid by reddish clay subsoils. These lands have a timber growth of pine, oak, and hickory, and, it is estimated, yield from 25 to 30 bushels of corn or about 800 pounds of seed-cotton per acre.

The reddish loam or red clayey lands are considered the best agricultural lands of the region, and are derived from the shales that usually immediately underlie them. These lands have a timber growth of red, black, white, and post oaks, dogwood, hickory, etc., and are very productive, yielding about 1,000 pounds of seed-cotton or from 30 to 35 bushels of corn per acre.

The following analyses are given:

No. 312. *Sandy soil*, taken 8 miles north of Little Rock, Pulaski county. Timber growth, black and post oaks and some hickory.

No. 314. *Subsoil*, containing some small ferruginous concretions, taken near the above.

No. 363. *Soil of red land* from Sec. 33, T. 2 S., R. 30 W., Polk county. Timber growth, red, black, white, and post oaks, dogwood, black walnut, wild cherry, pine, red elm, and hickory. The soil is composed of millstone grit, crystalline sandstones and shales, with bands of black flint.

No. 365. *Subsoil*, taken near the above; contains fragments of chert.

No. 360. *Yellowish brown soil*, taken 1 mile north of Waldron, Scott county. Timber growth, red, white, black, and post oaks, black ash, elm, cherry, black walnut, and dogwood; undergrowth, white and black sumac.

No. 362. *Subsoil*, taken near the above. Dried, is of a gray-buff color.

No. 391. *Brownish-gray soil*, Sec. 18, T. 6, R. 21 W., Yell county.

No. 393. *Subsoil*, taken near the above. Dried, is of a gray-buff color.

No. 394. *Reddish ferruginous soil* from Sec. 2, T. 7, R. 25, Logan county. Timber growth, beech, oak, hickory, and post oak, with sumac undergrowth; derived from shales. Some ferruginous concretions separated from it before analysis.

No. 396. *Subsoil*, taken near the above. Contains a few small sandy, ferruginous concretions.

*Lands of the shale and sandstone region south of the Arkansas river.*

	SANDSTONE LANDS.		SHALE LANDS.							
	PULASKI COUNTY.		POLK COUNTY.		SCOTT COUNTY.		YELL COUNTY.		LOGAN COUNTY.	
	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.
	No. 312.	No. 314.	No. 363.	No. 365.	No. 360.	No. 362.	No. 391.	No. 393.	No. 394.	No. 396.
Insoluble matter.....	93.445	90.910	83.765	84.990	87.340	86.215	90.365	90.840	92.240	91.415
Potash.....	0.058	0.093	0.193	0.328	0.193	0.227	0.149	0.162	0.166	0.200
Soda.....	0.045	0.081	0.023	0.069	0.037	0.065	0.021	0.072	0.065	0.058
Lime.....	0.039	0.018	0.134	0.081	0.106	0.106	0.108	0.024	0.112	0.089
Magnesia.....	0.219	0.253	0.419	0.572	0.316	0.359	0.095	0.339	0.546	0.314
Brown oxide of manganese.....	0.145	0.096	0.220	0.395	0.145	0.195	0.125	0.115	0.100	0.190
Peroxide of iron.....	2.190	2.265	3.515	3.690	3.065	4.750	1.740	2.940	1.715	3.190
Alumina.....	1.275	3.455	5.200	6.110	4.085	5.585	2.165	3.100	1.240	1.840
Phosphoric acid.....	0.063	0.063	0.247	0.194	0.261	0.128	0.161	0.208	0.208	0.143
Sulphuric acid.....	0.027	0.033	0.062	0.058	0.050	0.042	0.058	0.033	0.058	0.023
Water and organic matter.....	2.763	2.354	6.343	3.322	4.763	2.873	4.556	1.956	3.254	2.034
Total.....	100.209	99.621	100.121	99.809	100.361	100.545	100.143	99.879	99.704	99.406
Hygroscopic moisture, air-dried.....	2.275	1.665	4.225	2.925	3.225	2.475	2.325	1.600	1.675	1.675

The lands derived from sandstone are shown by the analyses to be deficient in potash, lime, and phosphoric acid, the elements necessary for continued fertility. Magnesia is present in fair quantity.

The lands from the red shales show fair amounts of potash and lime and a good percentage of phosphoric acid and magnesia. They should be very durable, especially if lime be applied after a few years' cultivation.

COUNTRY NORTH OF THE ARKANSAS RIVER.—The surface of this part of the region is generally hilly and broken, and is timbered to the Ozark range of mountains along the northern border. These highlands are composed of the usual sandstones and shales of the millstone grit formation, which, by their inclination toward the south, have allowed the underlying limestone to come to the surface or be exposed in the sides of the hills.

In White county, on the east, the sandstone and millstone grit form high and prominent table-lands and cliffs, especially along the bluffs of Little river, imparting wild and romantic scenery to the country for many miles along the banks of that stream. The table-lands on the borders of this and Van Buren county are about 400 feet high, have sandy soils, and are timbered with a forest growth of pine. The northern part of Conway and western portion of Van Buren are mountainous, the mountains north of Clinton attaining an elevation of more than 1,200 feet. These continue through the northern parts of Pope, Johnson, Franklin, and Crawford and southern parts of Madison and Washington counties, while southward the country is less hilly, and affords a greater proportion of tillable lands. The Boston mountains, a high and broken range, occur in the adjoining parts of Crawford and Washington counties. The limestone appears more generally in these western counties than on the east, outcropping at the foot of the hills, and sometimes entering into the composition of the lands. Open, marshy prairies also occur occasionally in these counties in localities where the underlying impermeable shales or clays present large flat areas. In Washington county only some of these prairies, underlaid by red shales, have a soil more permeable to water, which is partly cultivated. The lands are similar to those on the south of the river already described, except in localities where the limestone can effect a difference in composition and, consequently, in fertility. The gray sandy lands from sandstone disintegration occupy chiefly the table- and hill-lands, and present tillable areas only where the surface is sufficiently flat to avoid washing away and where water does not find an easy course down the declivities and is retained, moistening the ground by percolating through it. The timber growth is usually Spanish, black-jack, post, white, black, and red oaks, pine, chestnut, chinquapin, and persimmon. On some of the table-lands pine is most prominent, forming large forests, as in the southeastern part of Van Buren county; on others black-jack oak, or stunted oak and hickory, is the chief growth, especially on gravelly ridges. These lands are not very durable, though producing good crops for a few years. Their yield is said to be about 800 pounds of seed-cotton, 25 bushels of corn, or 12 bushels of wheat per acre.

The red loams or clayey lands derived from the shales are the best and most productive uplands of the region. These are found in the valleys, and at the foot of the ridges are usually covered by or commingled with the sand washings. The red lands, when not open prairies or post-oak flats, are timbered with red, scarlet, black, and chestnut oaks, sweet and black gums, wild black cherry, hickory, etc.

A large area of lands of this character occurs in White and Van Buren counties, and are supposed to cover about 360 square miles, or 30 miles east and west and 12 north and south. The red soil of these level farming lands is quite productive, yielding good crops of cotton, corn, wheat, and the finest oats in ordinary seasons, viz, 800 to 1,500 pounds of seed-cotton, 20 to 25 bushels of wheat, or 40 to 60 bushels of oats per acre, when there are seasonable rains. This soil, an analysis of which is given (No. 279), is probably a fair representative of the red lands of the entire region where they are not underlaid by tenacious clays or shales, which tend to render them stiff and marshy. The banks or bottoms of water-courses running between the high hills are generally narrow and rocky, and do not afford large tillable areas; but in the more level country along the Arkansas river they are wider, and in some of the counties are broad, flat, and marshy, with a growth of water, willow, and pin oaks, interspersed with a few very small prairies.

The following analyses indicate the character of the gray sandy and red clayey soils of this region:

No. 318. *Gray sandy soil*, taken  $1\frac{1}{2}$  miles east of Clarksville, Johnson county. Principal growth, post, black, and black-jack oaks, persimmon, and sumac. This soil contains a considerable quantity of iron gravel and fragments of ferruginous sandstone.

No. 320. *Brownish orange-colored subsoil*, with a little iron gravel, taken near the above.

No. 315. *Gray sandy soil* from six miles north of Dover, Pope county. Large timber growth of post, black, red, and white oaks, and some hickory.

No. 317. *Subsoil*, taken near the above. Contains also a few fragments of ferruginous sandstone.

No. 309. *Brownish upland soil*, taken 1 mile from Van Buren, Crawford county. Derived in part from the shales. This soil contained one-fourth its weight of ferruginous sandstone in fragments, which were separated before analysis.

No. 311. *Subsoil*, taken near the above.

No. 288. *Reddish soil* from T. 5, R. 14, Faulkner county, derived from the shales. Timber growth, black oak, hickory, and some white and black-jack oaks. Some fragments of ferruginous sandstone were removed from it before analysis.

No. 290. *Subsoil*, taken near the above.

No. 279. *Reddish soil* of true oak land from Sec. 13, T. 9 N., R. 12 W., in the southeastern part of Van Buren county. Timber growth, black and post oaks, with sumac undergrowth.

No. 281. *Subsoil*, taken near the above.

No. 300. *Red ferruginous soil* from 8 miles west of Searcy, White county. Timber growth, black, red, and black-jack oaks and hickory. This soil is derived from the ferruginous shales, fragments of which were separated from it before analysis.

No. 302. *Subsoil*, taken near the above. Dried, is of a brick-dust color.

No. 276. *Red upland soil*, overlying the Archimedes limestone in the central part of Washington county. Timber growth, white and overcup oaks, hickory, hackberry, walnut, slippery elm, ash, dogwood, and locust, with an undergrowth of papaw, spice, and large grape-vines.

No. 278. *Red subsoil* from near the same place.

*Red lands region north of the Arkansas river.*

	GRAY LANDS.						RED LANDS.							
	JOHNSON COUNTY.		POPE COUNTY.		CRAWFORD COUNTY.		FAULKNER COUNTY.		VAN BUREN COUNTY.		WHITE COUNTY.		WASHINGTON COUNTY.	
	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.
	No. 318.	No. 320.	No. 315.	No. 317.	No. 309.	No. 311.	No. 288.	No. 290.	No. 270.	No. 281.	No. 300.	No. 302.	No. 276.	No. 278.
Insoluble matter .....	90.545	86.857	90.395	90.310	90.795	80.770	91.145	92.695	86.300	92.120	87.800	88.845	85.820	88.795
Potash .....	0.092	0.273	0.110	0.149	0.101	0.161	0.116	0.140	0.150	0.096	0.121	0.187	0.433	0.111
Soda .....	0.024	0.014	0.023	0.047	0.039	0.008	0.024	0.042	0.007	0.025	0.018	0.067	0.168	0.025
Lime .....	0.025	0.039	0.087	0.061	0.005	0.060	0.067	0.028	0.109	0.067	0.123	0.053	0.207	0.189
Magnesia .....	0.259	0.382	0.306	0.203	0.293	0.285	0.371	0.286	1.280	0.203	0.418	0.207	0.457	0.362
Brown oxide of manganese .....	0.145	0.270	0.145	0.105	0.105	0.170	0.270	0.170	0.245	0.245	0.220	0.245	0.205	0.405
Peroxide of iron .....	3.050	2.330	1.980	3.050	3.490	3.490	2.210	2.010	3.635	1.920	3.035	2.985	5.085	3.185
Alumina .....	1.910	5.110	2.985	3.085	1.600	3.115	2.625	3.115	3.440	2.515	2.215	4.875	2.015	1.545
Phosphoric acid .....	0.174	0.095	0.112	0.178	0.176	0.128	0.127	0.105	0.237	0.097	0.143	0.104	0.217	0.118
Sulphuric acid .....	0.033	0.033	0.041	0.033	0.041	0.013	0.050	0.016	0.038	0.033	0.055	0.033	0.050	0.050
Water and organic matter .....	3.316	4.147	4.212	2.398	3.176	2.271	3.207	1.469	5.592	2.407	4.080	2.714	5.325	4.571
Total .....	99.573	100.550	100.382	99.769	100.091	99.469	100.212	100.021	101.033	99.728	99.197	99.905	100.072	99.476
Hygroscopic moisture, air-dried .....	2.000	2.000	2.675	2.075	1.625	2.025	1.800	1.200	2.550	1.325	2.800	2.350	2.735	2.100

The richest soil in the list just given is that of Washington county, which contains fair percentages of phosphoric acid, potash, and magnesia. The lime is rather low, but, aided as it probably is by the magnesia, is in sufficient quantity for a short term of high productiveness, after which it must be applied to the soil. This soil is said to yield 800 pounds of seed-cotton, 25 bushels of corn, and 15 bushels of wheat per acre, and is especially adapted to oats. All of the other soils of the group, while mostly containing good percentages of phosphoric acid and small amounts of potash, are deficient in lime, the only exception being the red soil of White county, which surpasses all the others in this respect. As a consequence, it has a higher productive capacity, the yield being estimated at 1,500 pounds of seed-cotton per acre, against from 800 to 1,000 bushels per acre on the other soils.

WESTERN AND CENTRAL RED-LOAM PRAIRIE REGION.

In the counties of Sebastian, Logan, Yell, and Scott there are many open prairies interspersed throughout an area covering about 2,840 square miles, and lying between the Arkansas river and Fourche la Pave mountain chain. These prairie soils are underlaid by the reddish shales of the millstone grit or Carboniferous formation, and seem to occur always when an extensive area of the shales are level and flat. They are thus described by Professor Lesquereux:

The prairies of the Carboniferous shales are generally flat, surrounded by hills, or at least by a higher border, which gives them the appearance of the bottom of drained lakes. These prairies are of various extent, and, although they may overlie different kinds of ground or geological formation, in Arkansas they are generally underlaid by Carboniferous fire-clay or shales. In the spring they are covered with water, which cannot percolate, and, becoming true marshes for a time, have the vegetation of marshes—the rushes and the sedges. This semi-aquatic vegetation gives, according to the nature of the underlying strata, either a hard, compact, cold soil, by decomposition of shales or clay. A few trees—the water and pin oaks and honey-locust—grow along the creeks which meander in their middle. The soil is, in its natural state, mostly covered with the great composites of the prairies and the hard grasses, species of beard-grass and broom-corn (*sedge, Andropogon*). The prairies are most extensive in Sebastian county. Their surface is often somewhat rolling, with occasional elevated ridges and spurs and peaks of the mountain chains, and each is usually designated by some special name. They are not much in cultivation, but are chiefly devoted to the grazing of stock.

Grand prairie, of Franklin county, is underlaid by ferruginous black shales, or sometimes by the fire-clay of the coal. A few low hills are still left in the middle of it, with the original stratification of the measures to which they belong, a succession of shales and fire-clay. Some hills like these, but more abrupt and higher, look like Indian mounds on the flat surface of Long prairie, in Sebastian county. Neither humidity or a peculiar nature of the ground can account for the barrenness of these hills, on which there only grows the same species of herbaceous plants as those of the prairies.

The following analyses show the composition of these prairie lands:

No. 351. *Red sumac prairie soil*, Hodge's prairie, Sec. 12, T. 5, R. 31, Sebastian county, based on the shales over the coal. The dried soil is of a brown color, and contains some fragments of ferruginous sandstone.

No. 353. *Reddish subsoil*, taken near the above.

*Reddish loam prairies, Sebastian county.*

	Soil.	Subsoil.
	No. 351.	No. 353.
Insoluble matter.....	88.990	83.240
Potash.....	0.294	0.214
Soda.....	0.047	0.059
Lime.....	0.081	0.073
Magnesia.....	0.420	0.308
Brown oxide of manganese.....	0.175	0.165
Peroxide of iron.....	4.590	6.940
Alumina.....	1.235	4.510
Phosphoric acid.....	0.175	0.209
Sulphuric acid.....	0.058	0.050
Water and organic matter.....	3.675	4.247
Total.....	99.740	100.015
Hygroscopic moisture, air-dried.....	2.025	2.300

The above soil and subsoil are very deficient in lime, but possess a sufficiency of other elements of plant-food to insure excellent fertility if other circumstances, such as depth and drainage, were favorable.

NORTHWESTERN RED PRAIRIES.

Reference has already been made to the small prairies that occur between the ridges in Fulton county and that cap some of the ridges in Carroll and adjoining counties. Besides these, there are larger and more extensive ones in Carroll, the southern part of Boone, and more especially on the west of White river, in Benton and Washington counties, which extend westward and northward out of the state.

Marshall prairie, near the corner of the counties of Newton, Searcy, and Boone, is bordered on the south by mountain peaks rising more than 800 feet above its level, and the grayish loam soil of both this and Huzza prairie is derived in part from the sub-Carboniferous limestone, sandstones, and shale, and in part from the cherty limestone which underlies it. The surface is rolling and well drained; the soil is deep and very fertile, yielding, in good seasons, 50 to 60 bushels of corn and an average of 15 or 20 bushels of wheat.

The prairies of Benton and Washington counties are quite level, but the lowest portions are marshy and somewhat difficult to drain. They are thus described by Professor Lesquereux in the Arkansas report:

In the spring the low grounds are covered by 3 feet of water. When the drainage has been attended to, the prairie soil produces, on an average, 40 bushels of corn, 15 or 20 bushels of wheat, or from 1,000 to 1,500 pounds of tobacco per acre. The lands between White river and Bentonville are mostly oak barrens interspersed with prairies. West of Bentonville there is a mulatto soil, somewhat different in its character from that immediately around town, which is very productive.

Beatie's prairie, in the northwestern part of the county, has a gently undulating surface, fringed with groves of oak and small hickory and dotted with low mounds, bearing tufts of rank weeds, and made up of isolated heaps of chert gravel. The soil is underlaid by red clay.

The limestone prairies of northern Arkansas are singular in this fact, that their surface is not always flat, and that they are mostly placed on the soft declivities or coves along or between the ridges. They are mostly of small extent, and are surrounded by thickets of low trees. The compact or somewhat porous sub-Carboniferous limestone which they cover does not absorb water with rapidity. Hence, in the spring water percolates slowly along the slopes, taking with it the detritus of the stone and depositing it where its course is either stopped or slackened. A scant swamp vegetation springs up there; its decomposed remains are mixed with the original deposit, which, by and by, augments in thickness under the action of water and vegetation. This soil is naturally spongy, preserves water for a part of the year, like the peat which it resembles, and thus cannot sustain trees. They establish themselves on a firmer ground all around. When by successive contributions of limestone deposited by water and of particles of humus received from the plants this soil has become thick enough it is, when drained by a few ditches (serving as channels for the water of the rainy season), a fertile and easily cultivated ground. The channels of drainage are generally formed by a natural depression, the depth of which varies with the thickness of the soil of each prairie. In this case, as the coarser materials are of course heaped on the banks of these creeks, a few trees grow along them. They are mostly stunted specimens of the post and rock-chestnut oaks, persimmon, juniper, and a shrub, *Bumelia lanuginosa*, Pers. The characteristic herbaceous plants of these limestone prairies are especially *Ambrosia polystachya*, *Kuhnia eupatorioides*, *Aster sericeus*, *Croton capitatum*, *Grindelia lanceolata*, *Palafoxia callosa*, *Oxybaphus albidus*, etc., species which are not found on the prairies of other formations. Besides these, they are covered with a great number of species belonging to the prairies in general.

The following analyses only have been made of the prairie lands of this region:

No. 252. *Prairie soil* from land on Sugar Loaf creek, Marion county. Some fragments of decomposing chert were removed from it.

No. 254. *Subsoil*, taken near the above.

## COTTON PRODUCTION IN ARKANSAS.

*Prairie land of Marion county.*

	Soil.	Subsoil.
	No. 252.	No. 254.
Insoluble matter .....	82.520	88.960
Potash .....	0.301	0.204
Soda .....	0.152	0.084
Lime .....	0.053	0.108
Magnesia .....	0.473	0.317
Brown oxide of manganese .....	3.465	2.865
Peroxide of iron .....		
Alumina .....	5.215	3.340
Phosphoric acid .....	0.230	0.137
Sulphuric acid .....	0.067	0.038
Water and organic matter .....	7.729	3.534
Total .....	100.205	99.737
Hygroscopic moisture, air-dried .....	4.265	1.950

This land, while well supplied with potash, magnesia, and phosphoric acid, is deficient in lime. Vegetable matter is present in the soil in large amounts. Under favorable circumstances, and with the application of lime, this soil should be highly productive.

## METAMORPHIC REGION.

This region is represented by granites and other eruptive rocks, chiefly in Pulaski, Saline, Garland, and Hot Spring counties, with a small area also in Pike, and by metamorphosed shales and sandstones of the millstone grit in Polk county, where it forms the Cossatot range of mountains, lying south of Dallas and extending east and west.

The granitic regions are usually broken and hilly, the ridges sometimes forming coves, in which tillable lands are occasionally found. Of these, Magnet cove, on the line of Garland and Hot Spring counties, and Fourche cove, south of Little Rock, in Pulaski county, are the most prominent. The lands of the latter are, however, composed chiefly of the sands, clays, etc., of the Tertiary pine-hills of the southern part of the state, though hemmed in by granitic ridges. Northward from the ridges are areas of tillable granitic lands, embracing mostly sandy and gravelly soils, with a timber growth of red, black, and white oaks, black and pig-nut hickory, dogwood and maple. When under cultivation these lands are said to produce 30 bushels of wheat or 25 bushels of corn per acre. One of the greatest disadvantages of this soil is its disposition to produce a spontaneous growth of persimmon sprouts, which are very difficult to eradicate. There are said to be some fine lands in Magnet cove. The granites, dykes, and metamorphosed rocks of other localities appear in such small areas that their material from disintegration does not affect the lands to any obvious extent, and they are therefore included in the more general region of the red lands of the millstone grit. The following analyses are given:

No. 400. *Granite soil* near the eastern slope of the granite range of Fourche cove, near the north line of Sec. 4, T. 1 S., R. 12 W., Pulaski county. Timber growth, red and white oaks, dogwood, black and pig-nut hickory, and maple; soil, dried, is of a light gray umber color, with small fragments of decomposing granite.

No. 402. *Brownish gray* subsoil, taken near the above.

No. 403. *Under clay* of the above. Light brick-dust color, and contains spangles of mica.

*Granite lands, Pulaski county.*

	Soil.	Subsoil.	Underclay.
	No. 400.	No. 402.	No. 403.
Insoluble matter .....	85.811	87.840	60.515
Potash .....	0.208	0.227	0.347
Soda .....	0.065	0.081	0.384
Lime .....	0.215	0.123	0.123
Magnesia .....	0.426	0.489	1.266
Brown oxide of manganese .....	0.205	0.140	0.140
Peroxide of iron .....	4.300	4.390	7.050
Alumina .....	3.860	4.635	21.365
Phosphoric acid .....	0.128	0.143	0.189
Sulphuric acid .....	0.055	0.041	0.045
Water and organic matter .....	4.577	2.524	8.326
Total .....	99.910	100.113	100.350
Hygroscopic moisture, air-dried .....	2.775	1.950	5.675

This land, while sandy in character, has a fair proportion of potash, phosphoric acid, and lime, as well as of magnesia. There is comparatively little difference between the soil and subsoil, but the underclay is much richer in potash and phosphoric acid, and has a very large amount of alumina, which also holds much water. The depth to this clay from the surface is not given.

#### NORTHERN BARRENS AND HILLS REGION.

The region thus designated, occupying the extreme northern part of the state, is bounded by Missouri on the north and Crowley's ridge and the alluvial region on the east, while the southern boundary is marked rather indefinitely by a line extending from the great bend of White river, at the mouth of Black river, in Independence county, westward through the southern part of Stone, Searcy, and Newton and the middle of Madison, and northward through east Benton, to the Missouri line. The region thus embraces nine entire counties and parts of six counties, and covers an area of nearly 9,000 square miles.

White river, rising in the western part, flowing at first with a northern course into Missouri, and soon turning southeastward through the central part, drains with its many tributaries the entire region. The surface of the country is generally very hilly and broken, the highest ridges and mountains occurring in Newton county, where the Boston mountains rise to an elevation of about 1,000 feet above the lowlands. This region of high hills extends northward into the southern part of Boone and Carroll counties, where some of the peaks are more than 1,200 feet above the streams. In other counties the ridges are from 150 to 300 feet high, except on the southeast, where some of them are as much as 500 feet high. The surface of the counties that lie on the east and south as far west as Washington is well timbered both on the hills and in the valleys, while in Fulton, Baxter, Marion, Boone, and Carroll the timbered lands are interspersed with small prairie barrens, that increase in extent westward from Fulton, until at Bentonville, in Benton county, the country opens out into the broad open prairies of the west. The highest ridges, where covered with cherty and siliceous soils, whether derived from the cherty rocks of the sub-Carboniferous of the first group or those of the Lower Silurian of the prairie counties, are usually timbered with a growth of pine.

Two general subdivisions may be recognized in this region, viz :

1. Cherty and siliceous hills, with heavy beds of sandstones, forming mostly sandy and well-timbered lands.
2. Cherty and magnesian limestone hills, forming barrens, prairies, and sandy lands.

The entire region has a population averaging nearly fifteen persons per square mile, unequally distributed in the counties. Independence, on the east, and Carroll, on the west, have the highest averages, while Newton and Stone, in the center, have the lowest, due no doubt to the hilly and broken character of the country. The average of cotton is 9.1 acres per square mile for the region, and that of all lands under cultivation is 61.9 acres per square mile.

Independence county has the largest cotton acreage, but Marion has the highest percentage of tilled lands (24.8) devoted to the culture of that crop. As a cotton-producing region this naturally ranks low (14.7 per cent. of tilled land), because of its high latitude, though in several of the counties of the extreme north that crop embraces a greater percentage of the lands under cultivation than in some counties one or two degrees further south. The average product per acre is quite high (840 pounds of seed-cotton).

The greatest proportion of cotton is produced in the counties on the east, their average acreage being from 14 to 21 acres per square mile, this average decreasing westward, until in Madison it is but the fraction of an acre and in Carroll 1.4 acres per square mile.

#### SANDY AND CHERTY LANDS OF THE SANDSTONE REGION.

This division embraces chiefly the counties of Independence, Stone, Searcy, Newton, Madison, the northern part of Carroll, the southern part of Izard, and parts of other counties, and comprises perhaps the most hilly portion of the northern region. The hills are composed mostly of the sandstone and barren limestone of the sub-Carboniferous formation, often capped with heavy beds of chert, and the soils, sandy and gravelly in character, have a timber growth either of pine, or, when thin, of a low scrub oak, and are termed "oak barrens". Though producing perhaps well for a few years, these soils are not durable, and the elements of fertility soon become exhausted. Analysis No. 285 shows the small percentages of important elements in a soil of this character in Benton county. The productiveness of the virgin soil is not given, but an old field soil, taken near the same place and twenty-three years under cultivation, is said to yield about 35 bushels of oats per acre; its analysis, however, shows it to have been of a better class than the oak barrens proper. The limestone that underlies these cherty and sandstone beds, when coming near the surface on the lower ridges or when outcropping on the sides of the hills, produces, by the commingling of its limy materials with the sands, a rich and highly productive soil. Such lands are found throughout the entire region in the valleys and on the hillsides, whose slope is so gradual as to prevent the washing away of the soil. A characteristic sample of these lands is given in No. 240, from Izard county. This land has a timber growth of post and white oaks, hickory, persimmon, and dogwood, and in some localities black-jack oak and sassafras are abundant. The subsoil is usually a dark yellowish clay, and the lands are said to



produce 30 bushels of wheat, 40 to 50 of corn, 20 to 25 of oats, and about 800 pounds of seed-cotton per acre. From Long creek to King's river, along the Bentonville road westward, there is a succession of low hills, formed of alternate strata of cherty limestone and of sandstone, which are generally cultivated, except on some of the most rocky and dry places. The highest ridges are still covered with beautiful prairies of the same nature, which have the same fertility and the same vegetation as Huzza prairie, on the southeast. The dividing ridges in the northwestern part of Madison county are formed partly of sandstone and partly of cherty limestone, and are barren and dry when high, steep, and narrow, but are fertile when low, with gentle slopes, and thus keep on their summit or their declivities the decomposed particles of limestone, which, on steep and narrow ridges, are easily washed down by the rain. The divide between War Eagle creek and White river, in this county, is timbered with pine, chinquapin, chestnut, and post, black-jack, and chestnut oaks. Another rocky divide lies on the west of White river and at the edge of the prairie region that extends westward.

The following soils, whose analyses are given, are probably fair samples of the lands thus briefly described :

No. 285. *Sandy soil*, taken east of Bentonville, Benton county. Timber growth, black hickory; undergrowth, sumac and hazel.

No. 287. *Subsoil*, taken near the above.

No. 306. *Brush creek barrens soil* from the northwestern part of Madison county. Growth, black-jack oak and hickory. This soil contains fragments of decomposing chert.

No. 308. *Subsoil* from near the above.

No. 291. *Light umber-colored soil*, taken near Jasper, Newton county. Timber growth, black, white, red, and water oaks, black and sweet gums. Ferruginous and cherty fragments were separated from it.

No. 293. *Brownish, buff-colored subsoil*, taken near the above.

No. 294. *Soil* from near the mouth of Dry Fork of Clear creek, northwest part of Searcy county.

No. 296. *Subsoil*, taken near the above.

No. 240. *Uplands soil*, lot 25, T. 15, R. 8 W., Izaard county. Timber growth, post and white oaks, hickory, dogwood, and persimmon. This soil contains some clear grains of sand and fragments of decomposing chert.

No. 242. *Brownish-colored subsoil*, taken near the above.

No. 303. *Soil*, taken two miles west from Batesville, Independence county. Growth, hickory, oaks, etc.

No. 305. *Yellowish brown subsoil* from near the above.

*Sandstone and barren limestone lands.*

	BENTON COUNTY.		MADISON COUNTY.		NEWTON COUNTY.		SEARCY COUNTY.		IZARD COUNTY.		INDEPENDENCE COUNTY.	
	Soil.	Subsoil.	BARRENS LAND.		Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.
			Soil.	Subsoil.								
	No. 285.	No. 287.	No. 306.	No. 308.	No. 201.	No. 293.	No. 294.	No. 296.	No. 240.	No. 242.	No. 303.	No. 305.
Insoluble matter.....	92.320	92.195	89.945	91.845	84.945	90.845	92.695	89.445	81.720	85.080	88.920	90.130
Potash.....	0.125	0.193	0.137	0.130	0.137	0.170	0.164	0.150	0.405	0.372	0.205	0.207
Soda.....	0.025	0.037	.....	0.015	0.054	0.054	0.007	0.057	0.111	0.105	.....	0.004
Lime.....	0.053	0.026	0.110	0.067	0.418	0.100	0.336	0.112	0.283	0.137	0.137	0.095
Magnesia.....	0.364	0.976	0.230	0.579	0.313	0.347	0.184	0.364	0.403	0.561	0.202	0.280
Brown oxide of manganese.....	0.145	0.170	0.245	0.320	0.445	0.470	0.195	0.470	0.180	0.130	0.045	0.205
Peroxide of iron.....	2.000	2.560	1.885	2.160	2.110	2.400	1.320	2.410	4.270	4.485	1.985	2.310
Alumina.....	0.840	1.100	2.715	2.325	2.090	3.140	1.140	3.475	5.440	4.790	3.325	2.315
Phosphoric acid.....	0.078	0.040	0.195	0.193	0.131	0.084	0.078	0.151	0.230	0.193	0.162	0.145
Sulphuric acid.....	0.024	0.016	0.041	0.022	0.050	0.042	0.042	0.033	0.045	0.042	0.045	0.012
Water and organic matter.....	2.818	1.494	4.053	2.114	7.722	2.303	2.933	2.919	0.874	3.343	4.204	2.788
Total.....	98.792	98.897	100.156	99.770	98.415	100.024	99.094	99.586	100.060	99.238	99.020	98.581
Hygroscopic moisture, air-dried.....	1.550	1.225	2.750	1.875	4.500	2.075	2.000	2.425	3.025	2.050	3.075	2.275

The soils taken from Benton and Madison counties are said to be derived chiefly from sandstones; hence their high percentages of sand and insoluble matter. That from the former county is deficient in phosphoric acid and lime, while having also a low percentage of potash. In the soil from Madison the percentage of phosphoric acid is good, that of lime fair, while that of potash is low. The other soils of the division are partly derived from limestone of the hills, as shown by an increased amount of lime, and this should add much to their thriftiness. Otherwise, with the exception of that from Izaard county, they do not differ materially from the first-named group.

The percentages of potash and of phosphoric acid are high in the limestone soil of Izaard, and it contains much more clay than is found in the other samples. The vegetable matter in this as well as in the Newton county soil is high, and must exert an important influence toward their high productiveness.



## CHERTY MAGNESIAN LIMESTONE HILLS, BARRENS, AND PRAIRIES.

This region embraces most of the counties along the northern boundary-line, with parts of Independence, Izard, and Lawrence on the east, and Newton and Carroll on the west, and is marked or underlaid mostly by the Lower Silurian cherty magnesian limestones, etc. On the east, along Black river, and extending back several miles, the hills are capped with Quaternary gravel, pebbles, and ferruginous sandstone, and have a timber growth of small oaks and hickory. Westward the summits of the ridges are mostly cherty and gravelly, timbered in some cases with pine and in others with only a low and scrubby growth of oak. Small prairies are interspersed throughout the region westward from Fulton county, occupying mostly the valleys between the hills.

The following description of these northern counties is taken from Professor Lesquereux in the Arkansas survey report:

The geographical character of the country is that of a plateau divided into a series of successive ridges by numerous clear creeks, mostly running southward or northward to White river, or by some of its forks. When the ridges are composed of compact, hard magnesian limestone, they are nearly barren, the top only being covered with a scanty vegetation. When the limestone is somewhat porous and retentive of water, the flat surfaces of the tops, or even the declivities of the ridges, are covered with prairies. Where the rock is soft and easily disaggregated it is mostly covered with trees. In the eastern part of Fulton county the ridges, mostly of cherty limestone, are rocky, but are, nevertheless, covered with trees of small size, the mockernut hickory and the black-jack and post oaks. The top of these ridges is clothed by a luxuriant vegetation of grasses and numerous species of herbaceous plants, thus furnishing a good and abundant pasture for cattle, especially for sheep. The slopes are gentle and covered with humus, or with a soil of greater fertility than might be supposed from the stunted growth of the trees. It is the hickory or mulatto barren soil, soft, permeable, of a grayish color, producing abundant crops of corn (50 to 60 bushels to the acre in favorable situations), and especially wheat (25 to 35 bushels). The trees growing on this kind of ground are scattered or distant, and are of the same species as those on the ridges, with the red, black, and white oaks. The Spanish oak is also mixed with this vegetation, but it is scarce, and of the remarkable variety *Quercus tridentata*, Englemann. On the hickory barrens the trees are generally of small size and the forests without underwood; a phenomenon which may be caused either by the hardness of the rock, which cannot be easily penetrated by the roots, or by fire, which ought to be active on such a rocky light soil. Between these low cherty ridges the flats or bottoms along the creeks are mostly half-prairies, covered with shrubs, green briars, Indian currant, two species of sumac, the kinnikinnik, and sassafras. The soil is black, deep, somewhat cold and clayey, and apparently less fertile than the soil of the slopes. It produces on an average 40 to 50 bushels of corn, and is too compact and too strong for wheat. As these half-prairies form the banks of streams, of which the beds are generally deeply cut, it would be easy to drain them, and thus they would be better for agricultural purposes than the upper mulatto land, because they are formed of the same rock, have the same elements, and have also a far greater nutritive power.

Between Salem and Benetz bayou (westward) the sub-Carboniferous sandstone crops out and constitutes some hills, and its vegetation shows a difference first in the size of the trees, which become larger and of a more healthy growth. With the mockernut, the black-jack and post oaks in the most barren places, this sandstone has the chinquapin, or dwarf chestnut, which sometimes descends the declivities to the base of the hills; upon the gentle slopes the black, red, scarlet, white, and Spanish oaks (this last becoming of great size), and the black gum, which does not like the limestone. The underwood is pretty thick in places, formed of sumac, hazel, and especially of the farkleberry, also a species characteristic of the sandstone. Where the underwood is wanting, three or four species of bush clover, a beautiful blue gentian (*Gentiana puberula*), three species of gerardia, some asters, especially *Diplopappus linearifolius*, and the dittany, all, except the last, showy and richly-colored flowers, clothe the rocky ground. Though this sandstone is more favorable for the vegetation of trees than the cherty limestone, the agricultural value of the soil derived from it is far from being as great. The decomposed parts of the rocks, though pulverized and mixed with the decayed remains of plants, preserve their nature of sand.

The Rap and Talbot barrens, in Baxter county, have a soil about like that of the half-prairies of Fulton county. Where thick enough it is said to produce 40 or 50 bushels of corn per acre. It is too strong for wheat, and would require to be drained, or at least deeply plowed, to show its full value. Naturally irrigated every year by water running from the ridges of soft porous limestone, they are continually furnished with the nutritive elements of a rich soil.

In the central part of Marion county magnesian limestone crops out and forms higher, more abrupt, and entirely barren ridges. Trees are scarce there. Only a few stunted specimens of the rock-chestnut oak, juniper, persimmon, and winged elm grow in the cracks of humid decomposing rocks. Some species of herbaceous plants, the ragweed (*Ambrosia polystachya*), the flocculent and whitish *Croton capitatum*, the pretty *Stenosiphon virgatum*, and the hard and long-beard grasses help to cover the barrenness of this formation. These ridges produce nothing. The patches of thin yellow soil, which are here and there attached to places where the water cannot attain them and carry them away, look like half-burnt pieces of brick, which can scarcely be attacked by any kind of vegetation. On the way from Yellville to Carrollton, in Carroll county, the alternation of high, steep, and sterile hills of the magnesian limestone with low and undulating ridges of fertile cherty limestone show a remarkable contrast in the vegetation, and consequently in the fertility of both formations. The highest ridges of Marion county are overlaid by sub-Carboniferous sandstone, sometimes covered with pines.

The chemical composition of these barren and siliceous lands is shown in the following analyses of samples taken in several of the counties:

No. 264. *Barrens soil* from Sec. 31, T. 18, R. 17 W., Fulton county. Timber growth, a few scrub hickories, oaks, and walnuts.

No. 266. *Subsoil*, taken near the above. Contains fragments of chert.

No. 261. *Barrens soil* from Sec. 23, T. 19, R. 14 W., Baxter county. Growth, rosin-weed and grass. Some fragments of chert were taken from it.

No. 263. *Yellowish subsoil*, taken near the above.

No. 255. *Upland siliceous soil* from near the waters of Big creek, Marion county. Growth, big-bud hickory and black-jack and red oaks. A few small fragments of ferruginous chert were removed from it.

No. 257. *Subsoil* from near the above.

No. 267. *Second upland siliceous soil*, Fulton county. Growth, white oak and hickory.

No. 269. *Subsoil* from near the above.

No. 248. *Upland siliceous soil*, taken a few miles west of Powhatan, Lawrence county. Growth, black-jack and post oaks and small hickory. This soil contains ferruginous chert.

No. 250. *Subsoil* from near the above.

No. 270. *Pine upland soil*, one mile from Calico, Izard county. Growth, black oak, hickory, and pine. This soil contains a large proportion of fine, clear, rounded grains of sand. Some fragments of chert were removed from it.

No. 272. *Sandy subsoil* from near the above.

*Barrens and cherty and siliceous lands.*

	BARRENS.				CHERTY AND SILICEOUS LANDS.							
	FULTON COUNTY, TIMBERED.		BAXTER COUNTY, PRAIRIE.		MARION COUNTY.		FULTON COUNTY.		LAWRENCE COUNTY.		IZARD COUNTY, PINE HILL.	
	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.	Soil.	Subsoil.
	No. 264.	No. 266.	No. 261.	No. 263.	No. 255.	No. 257.	No. 267.	No. 269.	No. 248.	No. 250.	No. 270.	No. 272.
Insoluble matter.....	79.420	77.845	76.295	83.220	89.920	90.705	88.070	91.845	92.820	91.270	91.845	93.880
Potash.....	0.686	0.700	0.093	0.430	0.236	0.249	0.232	0.265	0.154	0.328	0.156	0.168
Soda.....	0.061	0.101	0.583	0.117	0.120	0.141	0.081	0.016	0.064	0.115	0.055	0.019
Lime.....	0.380	0.243	0.364	0.190	0.196	0.109	0.224	0.039	0.100	0.109	0.039	0.056
Magnesia.....	0.341	0.863	0.815	0.526	0.304	0.290	0.383	0.371	0.337	0.245	0.285	0.296
Brown oxide of manganese.....	0.220	0.370	0.295	0.295	2.165	2.665	0.320	0.270	0.120		0.070	0.145
Peroxide of iron.....	4.110	5.360	3.810	3.350			1.960	2.860	0.576	5.890	1.290	1.165
Alumina.....	5.165	7.240	5.015	3.760	2.615	3.340	1.815	3.265	2.115		2.065	2.290
Phosphoric acid.....	0.164	0.165	0.147	0.162	0.193	0.117	0.162	0.078	0.095	0.078	0.104	0.095
Sulphuric acid.....	0.084	0.059	0.084		0.028	0.025	0.050	0.050	0.028	0.083	0.024	0.011
Water and organic matter.....	7.575	6.841	11.011	6.133	4.808	2.309	5.793	1.794	2.970	1.979	3.673	1.705
Total.....	98.206	98.787	99.112	98.219	100.085	100.180	99.040	100.853	99.388	100.047	99.606	99.800
Hygroscopic moisture, air-dried.....	3.875	4.200	4.650	2.825	1.950	1.300	2.475	1.100	1.325	1.050	1.465	0.875

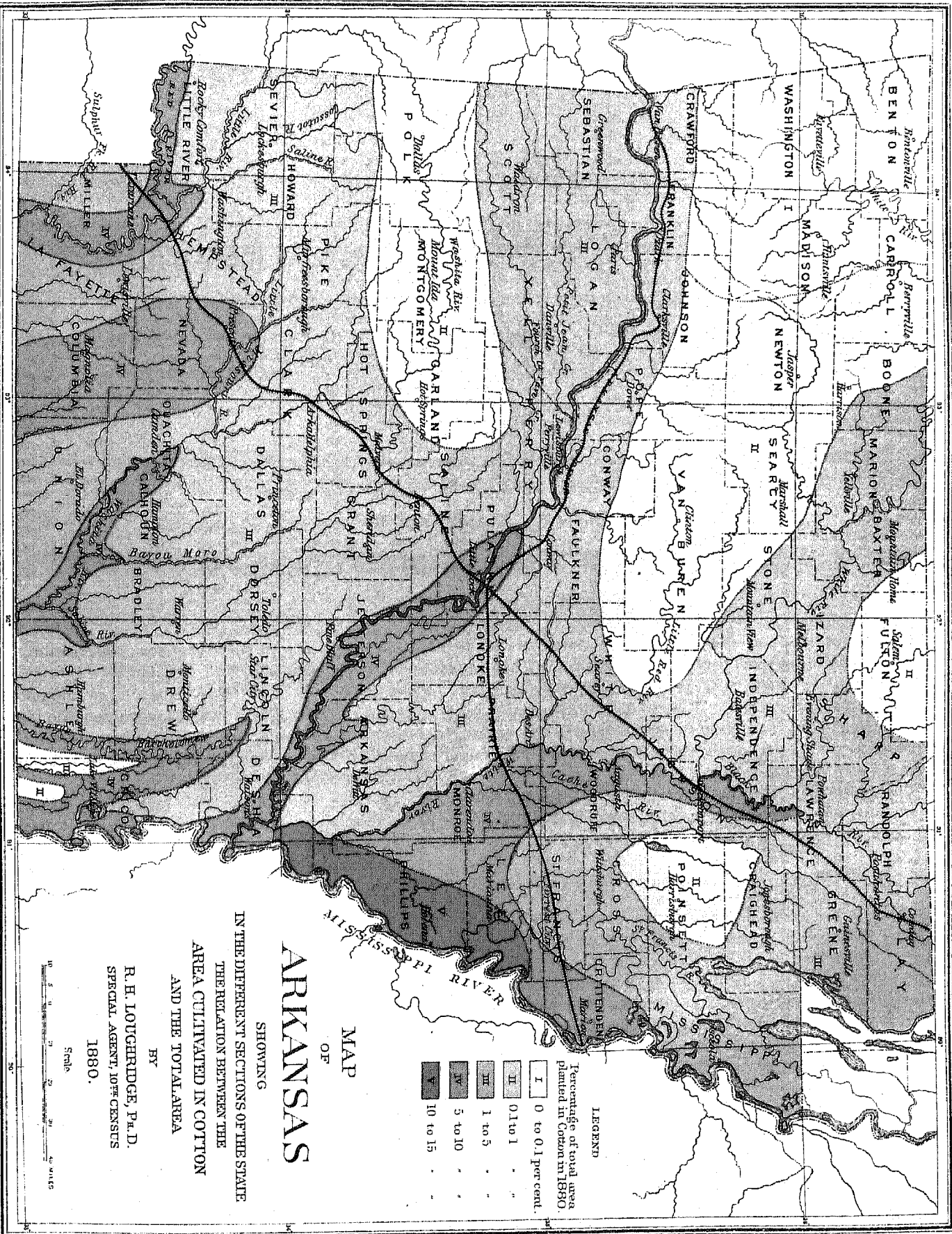
The barren lands do not deserve their name if we are to judge them entirely by their chemical composition, for they contain very high percentages of potash, with fair amounts of phosphoric acid and lime. The vegetable matter is also very high, with probably a corresponding high humus percentage, carrying with it a large amount of available phosphoric acid. Everything indicates a high productive power under favorable mechanical conditions. The red clays of the hills seem to be especially rich in potash, an analysis of a sample from Marion county showing the presence of 0.921 per cent. with 0.453 of soda. This was found underlying the magnesian limestone and sandstone, forming a stratum 6 to 8 inches thick.

The cherty and siliceous lands show their sandy character by high percentages of insoluble matter and rather low amounts of potash and lime, with, however, fair amounts of phosphoric acid. In Lawrence county, and in the pine lands of Izard, the phosphoric-acid percentage is too low for what might be considered a fertile soil.

#### GENERAL REMARKS ON COTTON PRODUCTION.

There is no record at hand showing the early history of cotton production in Arkansas, but it is more than probable that cotton formed one of the crops long before its admission as a state into the Union in 1836. From the several census reports the following statistics have been obtained: The first record, that of the census of 1840, shows a production of 15,072 bales of 400 pounds weight, which was an average of a bale to every six persons then in the state. In 1850 the population had a little more than doubled, while the production of cotton was more than four times as great as that of the previous census. Of the fifty-one counties of the state, seventeen produced each more than 1,000 bales, Chicot being first, with 12,192 bales, and Union second, with 7,037 bales. Nine counties produced each from 500 to 1,000 bales, eleven counties from 100 to 500, and nine below 100 bales, Randolph and Washington having one bale each. The counties of Benton, Carroll, Newton, Perry, and Searcy reported no yield. The census of 1860 showed another doubling of the population over that of 1850, while the yield in cotton had increased five and one-half times, the ratio then being a little more than eight-tenths of a bale to each person.

The census of 1870 showed that the laboring classes, and especially the negroes, had not recovered from the demoralization consequent upon the civil war, for although the population had increased 11.3 per cent., the amount of land under cultivation and the cotton yield had fallen off to but 67.5 per cent. of what it was in 1860, and cotton production averaged but half a bale per capita. Jefferson county had the greatest yield and Phillips the next; six counties had each a yield of over 10,000 bales; thirty-eight from 1,000 to 10,000; twelve from 100 to 1,000; while four had a less number than 100, and one had none.



By the census of 1880 we find that the population of the state has increased a little more than 65 per cent. over that of 1870, and the lands under cultivation 84.5 per cent.; while the number of bales has been much more than doubled, being now an average of seven-tenths of a bale per capita.

**STATISTICAL RESULTS OF THE TENTH CENSUS.**—Arkansas in 1879 produced 608,256 bales of cotton from 1,042,976 acres, as shown by the statistical tables at the beginning of this report, and ranked as fifth in total production among the cotton-producing states, though sixth as regards the number of acres devoted to its culture. This crop is produced to a greater or less extent in all of the seventy-four counties, and although the latitude of the northern part of the state causes a short season, yet fair crops are produced, the average product per acre gathered being more than half a bale, or from 750 to 850 pounds of seed-cotton, even in the hilly counties far removed from the rich bottom lands of the Mississippi river. This high yield, brought about probably by careful culture by white labor, has, together with increased facilities for transportation, been the cause of an increased average in the past few years in these northern counties. Where, in 1870, scarcely any cotton was planted, census statistics for 1879 show that, while for the state at large the acreage of corn is much greater than that of cotton, there are twenty-nine counties in which the reverse is true, the acreage of cotton in some instances far exceeding that of any other crop. These comprise the southern portion of the Mississippi alluvial region and Crowley's ridge, all of the eastern prairie region, and all of the southern pine-hills region except the counties of Sevier, Howard, Hempstead, Bradley, Clark, and Grant. Pulaski county also has a greater cotton than corn acreage. That cotton should be the chief crop of these counties is not surprising when it is remembered that not only does the tillable area embrace a large proportion of rich river bottom lands so specially adapted to cotton culture, but that the laborers are chiefly negroes, who, from a lifetime association with that crop, seem wedded to it, so much so that they can hardly be induced to raise even the necessities of life. To them "cotton is king" most emphatically, presenting its golden visions of *cash in hand* when the crop shall be gathered, preceding the Christmas and New Year festivities. At this time old debts to merchants are to be paid and new arrangements made for the coming year. Cotton is also almost the only crop on which merchants and others will advance the necessary supplies for subsistence during the year, and new obligations are usually assumed by the laborer (an item of no small importance in the domestic economy of each family of this race), a cotton crop of a certain number of acres being pledged.

**ACREAGE.**—For the state at large the acreage devoted to cotton embraces 30.4 per cent. of all the lands under cultivation, or 3 per cent. of the total area of the state, and if evenly distributed would average 19.7 acres per square mile. We find, however, a greater acreage on the south, and of all the counties Phillips is foremost, with 42,650 acres, or an average of 67.7 acres per square mile. Lee and Jefferson have, respectively, 56.9 and 52.2 acres per square mile, these three counties being the only ones with an average higher than 38. In thirteen counties the average is between 30 and 38; in seventeen between 20 and 30; and in all others below that. With the exception of White county, the eighteen counties of the state whose acreage is above 20,000 lie south of the line from White river through Little Rock that marks the northern limit of the pine-hills region.

**PERCENTAGE OF TILLED LANDS IN COTTON.**—Chicot stands at the head of the counties in the proportion of cultivated lands devoted to cotton culture, viz, 69 per cent. Other counties above 50 per cent. are Jefferson, Crittenden, Phillips, and Lee. In thirteen counties the percentage is between 40 and 50; in twelve other counties one-third is devoted to cotton; in six the percentage is below 10, and in Benton, Washington, and Madison, in the extreme northwestern part of the state, less than one-half of 1 per cent. is given to cotton.

**PRODUCTION.**—About 69 per cent. of the state's production is raised in the counties south of the northeast and southwest diagonal line from Des Arc, on White river, through Little Rock, to the northern line of Sevier county; and in but five of the thirty-five counties north of the line is the yield greater than 10,000 bales, and in nine others greater than 5,000 bales. Benton, Madison, and Washington each produced, respectively, 126, 129, and 133 bales. On the south, Jefferson has 34,588 bales, the highest number in the state; Phillips 29,070, and Chicot 25,338 bales. Of the thirty-nine counties four have a production of more than 20,000 bales, two others more than 15,000, thirteen more than 10,000, and twelve more than 5,000 bales.

**PRODUCT PER ACRE.**—The general average product per acre for the state, as shown by census statistics for the year 1879, was a little more than half a bale (0.58); and, assuming that the average weight of bales was 500 pounds of lint (a weight given by correspondents from different parts of the state), we find the average product to have been 870 pounds of seed-cotton or 290 of lint. Arkansas thus ranks as third among the cotton states.

The richest and most productive lands are those of the Mississippi alluvial region, and here the yield was 1,215 pounds of seed-cotton per acre. Crowley's ridge, which properly belongs to the region, though embracing sandy uplands, has the next highest average, 945 pounds, a product higher than such lands alone would give, and representing rather a combination of the sandy uplands and alluvial lands which are found in these counties. The same is probably true of the eastern silt prairies, which adjoin these lands and have a productiveness of 900 pounds, thus ranking third in the list of regions.

The productiveness of the western red loam (870 pounds), as well as that of the northern barrens regions (840 pounds), is higher than that of the yellow loam and pine hills region (765 pounds), because of better lands and probably better culture by white labor.

## COTTON PRODUCTION IN ARKANSAS.

COUNTIES.—Chicot county, on the southeast, ranks first in the state in product per acre (1,410 pounds of seed-cotton), and is second in the entire list of counties of the cotton states, East Carroll, Louisiana, being first. It is one of a group of three counties in adjoining states and also adjoining each other (East Carroll, of Louisiana, Chicot, of Arkansas, and Issaquena, of Mississippi) that "form the center of maximum cotton production per acre on natural soils in the United States, and probably in the world". (Census Bulletin 251). Desha county is next to Chicot in yield per acre (1,290 pounds), while Mississippi and Jefferson rank as third and fourth.

Nine counties in the state have a yield per acre of more than 1,000 pounds of seed-cotton per acre; seventeen others, 900 to 1,000; twenty-three, found almost exclusively in the central and northern parts of the state, 800 to 900; thirteen counties, also in the same regions, from 700 to 800; ten counties, from 600 to 700 pounds, and the remaining two, Ouachita and Union, 555 pounds of seed-cotton per acre.

REGION COMPARISONS.—The following tables have been prepared to give at a glance a comparative view of the production of each region in the state, and also of the counties of each which rank as first in total number of bales produced and the yield per acre:

TABLE III.—SHOWING POPULATION AND COTTON PRODUCTION IN EACH AGRICULTURAL REGION OF THE STATE.

Agricultural region.	Area.	POPULATION.			COTTON PRODUCTION.										
		Total.	White.	Colored.	Acres.	Bales.	Average per acre.				Total in tons.		Per-centage of the state's total production.	Cot-ton acre-age per sq. mile.	Bales per sq. mile.
							Bales, 500 lbs.	Seed-cot-ton.	Lint.	Seed.	Lint.	Seed.			
	Square miles.						Lbs.	Lbs.	Lbs.						
The State.....	53, 045	802, 525	591, 631	210, 994	1, 042, 976	608, 256	0. 58	870	290	580	152, 064	304, 128	100. 0	10. 7	11. 5
Mississippi alluvial.....	3, 040	35, 837	10, 585	25, 252	85, 839	69, 910	0. 81	1, 215	405	810	17, 478	34, 956	11. 5	28. 2	23. 0
Crowley's ridge.....	7, 620	109, 790	65, 994	43, 796	188, 498	119, 649	0. 63	945	315	630	20, 913	50, 826	19. 7	24. 7	15. 7
Gray silt prairie.....	2, 470	28, 619	18, 805	9, 814	45, 645	27, 189	0. 60	900	300	600	6, 797	13, 594	4. 5	18. 5	11. 0
Yellow loam.....	14, 250	212, 218	118, 141	94, 077	391, 551	201, 612	0. 51	765	255	510	50, 402	100, 804	33. 1	27. 5	14. 1
Western red loam.....	16, 805	290, 201	255, 171	35, 120	250, 511	144, 804	0. 58	870	290	580	36, 216	72, 432	23. 8	14. 9	8. 6
Northern barrens and hills.....	8, 800	125, 770	122, 835	2, 935	80, 932	45, 082	0. 56	840	280	560	11, 258	22, 516	7. 4	9. 1	5. 1

TABLE IV.—SHOWING "BANNER COUNTIES" AS REGARDS PRODUCTION AND PRODUCT PER ACRE IN THE VARIOUS AGRICULTURAL REGIONS OF THE STATE.

Regions according to product per acre.	Average product per acre.	COUNTY IN EACH REGION HAVING HIGHEST TOTAL PRODUCTION.					COUNTY IN EACH REGION HAVING HIGHEST PRODUCT PER ACRE.					
		Name.	Rank in product per acre in the state.	Cotton acreage.	Total production, bales.	Product per acre.	Name.	Rank in total production in the state.	Cotton acreage.	Total production.	Product per acre.	Rank in product per acre in the state.
Mississippi alluvial .....	0.81	Chicot.....	1	26,941	25,388	0.94	Chicot.....	3	26,941	25,388	0.94	1
Crowley's ridge.....	0.63	Phillips.....	7	42,654	20,070	0.68	Phillips.....	2	42,654	20,070	0.68	7
Gray silt prairie.....	0.60	Lonoke.....	39	20,910	11,704	0.56	Arkansas.....	33	12,011	8,508	0.67	9
Western red loam.....	0.58	Pulaski.....	5	29,077	20,439	0.70	Pulaski.....	5	29,077	20,439	0.70	5
Northern barrens and hills.....	0.56	Independence.....	35	19,002	11,156	0.57	Fulton.....	63	3,994	2,438	0.61	20
Yellow loam.....	0.51	Jefferson.....	4	45,426	34,588	0.76	Jefferson.....	1	45,426	34,588	0.76	4

As "banner counties" of the state, Jefferson ranks first in the total number of bales produced, 34,588; Chicot first as regards the percentage of tilled lands devoted to the culture of cotton and the product per acre, while Phillips has a higher cotton acreage per square mile than any other county in the state.

The counties of the *yellow-loam region*, with a combined area of 14,250 square miles, or nearly 27 per cent. of that of the state, produced in 1879, from 391,551 acres, 201,612 bales, or 33 per cent. of the total yield. Its cotton acreage per square mile was 27.5, yielding 14.1 bales, and comprising 39.6 per cent. of the lands under cultivation. The yield per acre was 0.51 of a bale or 765 pounds of seed-cotton, and was lower than in any other region of the



state. Jefferson county produced the highest number of bales in this region (34,588), as well as in the state, its product per acre (1,140 pounds of seed-cotton) being also the highest in the region and fourth in the state.

The counties of the *western red-loam region*, covering an area of about 16,805 square miles, comprising 31.7 per cent. of that of the state, and of which 10.5 per cent. was in cultivation, had a cotton acreage of 250,511 acres, yielding 144,864 bales; this was 23.8 per cent. of the total production. The average per square mile was 14.9 acres and 8.6 bales, with a product of 0.58 of a bale or 870 pounds of seed-cotton per acre, the region thus ranking above the yellow loam or sand and pine-hills region. The county having the highest total yield was Pulaski, 20,439 bales, its product per acre, 1,050 pounds of seed-cotton, also being higher than that of any other county of the region. It ranks as fifth in the state in the latter regard.

*Crowley's ridge region* produced the third highest percentage, 19.7 of the total production of the state. It has an area of 7,620 square miles, or 14.3 per cent. of that of the state. In 1879, from 188,498 acres, the yield was 119,649 bales, an average of 945 pounds of seed-cotton per acre, thus ranking second. Its cotton acreage comprised 39.9 per cent. of its tilled land, and averaged 24.7 acres per square mile. Of the twelve counties comprising the region, Phillips ranks first, both in total number of bales and in product per acre. All of the counties had an average of more than 900 pounds of seed-cotton per acre, except Saint Francis, Greene, and Clay, and in these the yield was from 750 to 810 pounds. Poinsett has a sparser population and consequently a less acreage of tilled land and cotton than even the two counties on the extreme north.

The *Mississippi alluvial counties*, standing highest in product per acre, have an area of 3,040 square miles, comprising 5.7 per cent. of that of the state. Hardly 8 per cent. of this is in cultivation, and of such lands 55.6 per cent. is devoted to the culture of cotton, its acreage being 28.2 per square mile. In 1879 this region produced 11.5 per cent. of the state's production, or 69,910 bales of cotton from 85,839 acres, the average product being 1,215 pounds of seed-cotton or 405 pounds of lint per acre. Chicot county ranks first in this region in the number of bales produced, and first both in the region and state in its product per acre, 1,410 pounds of seed-cotton or 470 of lint. The other three counties have a high total production and product per acre.

The *northern barrens and hill lands* in 1879 produced 7.4 per cent. of the state's total production, although its cotton acreage was but 9.1 acres per square mile. The area of the counties comprising the region is 8,860 square miles, or 16.7 per cent. of the state's area. But 9.7 per cent. of this area is under cultivation, 14.7 per cent. of that being devoted to the culture of cotton. The product per acre was 840 pounds of seed-cotton. Independence county produced the greater number of bales, and nearly twice that of any other county of the region. In but two of the counties the number of bales was less than 1,000. Fulton, an upland county, has the highest product per acre in the region, 915 pounds of seed-cotton, and is nearly equaled by the adjoining county of Baxter. The average of all the counties is high, there being none having less than half a bale per acre.

The *gray silt prairies*, in the eastern part of the state, embracing but three counties, with an area of but 2,470 square miles, or 4.6 per cent. of the state's area, produced 4.5 per cent. of the cotton for 1879 from an acreage which averaged 18.5 acres per square mile. But 8.4 per cent. of its area was in cultivation, and of this 34.1 per cent. was devoted to the culture of cotton. Lonoke produced the greater number of bales, 11,704, the other two counties falling much below. Arkansas had the highest product per acre, 1,005 pounds of seed-cotton, the other counties averaging 840 and 870 pounds.

**TRANSPORTATION FACILITIES.—Rivers.**—The two large rivers, the Mississippi and the Arkansas, are navigable for steamboats throughout their limits within the state, while White river is open only as far north as Jacksonport, where it emerges into the alluvial plain from the rocky hills and mountains of the northern part of the state. The Ouachita is said to be navigable for a great distance, and the Red river, on the southwest, is open to boats throughout its course between the lines of Louisiana and the Indian territory. These streams thus afford facilities for easy transportation direct to New Orleans, Memphis, or northern ports, not only for the thirty-six counties that immediately border them, but for many others within easy hauling distance, an aggregate area of two-thirds or more of the state.

**Railroads.**—Little Rock is the center of the railroad system of the state, and from it railway lines reach westward along the Arkansas river border to Fort Smith, northeast to Saint Louis, southwestward to Texas, and eastward to Memphis, together with short lines elsewhere on the southeast, affording greater and quicker transportation facilities and with competitive rates from those portions of the state already having river routes. The people of the northern and western counties remote from the Arkansas and the navigable portion of White river are dependent entirely upon wagon transportation for the removal of their farm products to market, and under the circumstances it is somewhat surprising that cotton should form so large a part of the crops in the extreme north.

**Rates.**—The rates of transportation for cotton are fixed per bale for all bales of less than 600 pounds weight, and it thus happens that merchants and other buyers require that the minimum weight of all offered for sale shall be 400 or 450 pounds. On bales below that weight there is usually charged a forfeit of \$1, payable by the producer. Shipments are made from Little Rock to New Orleans at \$2, and to New York at \$5 a bale. Rates from particular counties are given with the county descriptions, Part II of this report.

## COTTON PRODUCTION IN ARKANSAS.

*Analyses of soils and subsoils (air-dried), made by Dr. Robert Peter.*

[Arranged from the Geological Survey Report of Arkansas, 1880.]

Number.	Description.	Locality.	County.	Vegetation.	Insoluble matter.	Potash.	Soda.	Lime.	Magnesia.	Brown oxide of man- ganese.	Peroxide of iron.	Alumina.	Phosphoric acid.	Sulphuric acid.	Carbonic acid.	Water and organic matter.	Total.	Hygroscopic moisture (air-dried).
ALLUVIAL LANDS.																		
1. Saint Francis and Mississippi river bottoms.																		
217	Black sandy soil	Foot of Crowley's ridge	Greene	Gum, walnut, and poplar.	90.0450.1520.050	0.2350.332	0.120	1.185	0.570	0.183	0.243	99.135	2.300			0.243	99.135	2.300
219	Gray sandy subsoil	do	do		97.9950.1320.048	0.0510.193	0.020	1.010	0.395	0.078	1.233	101.158	0.650			1.233	101.158	0.650
228	Black sandy soil		do	Poplar, gum, and oak	90.0650.1830.058	0.2210.296	0.246	1.485	1.490	0.2500.033	4.825	99.791	2.065			4.825	99.791	2.065
230	Red and stiff underclay		do		79.4350.3980.055	0.0070.400	15.335	0.2330.021			4.013	100.007	4.050			4.013	100.007	4.050
419	Light soil	Saint Francis river bottom	Craighead	Gum, elm, white oak, black hickory, and hackberry.	72.9150.4540.142	0.4030.745	0.245	4.640	7.485	0.2500.110	12.728	100.126	8.750			12.728	100.126	8.750
422	"Gum soil"	do	Crittenden		73.6450.7580.232	0.6551.155	0.320	6.240	9.655	0.2340.067	6.590	99.650	8.475			6.590	99.650	8.475
420	Light tenacious soil	Near No. 422	do	Largo oaks	71.0950.7110.138	0.6411.070	0.265	6.390	10.485	0.3470.101	9.319	100.592	8.950			9.319	100.592	8.950
423	Buckshot soil	Sec. 15, T. 7 S., R. 4 W	do		70.3700.8540.054	0.9011.837	0.170	7.655	10.185	0.3670.101	9.527	101.131	9.475			9.527	101.131	9.475
2. Arkansas river bottoms.																		
273	Waste land soil	Near Van Buren	Crawford		84.7200.4350.153	0.4501.170	0.145	2.360	2.515	0.1640.050	7.836	100.007	3.975			7.836	100.007	3.975
275	Light chocolate-colored subsoil	do	do		80.5950.5790.136	0.5290.436	1.363	0.213	0.052	6.532	100.485	4.525			6.532	100.485	4.525	
282	Brownish sandy loam soil	do	do		88.5200.2460.059	0.1240.880	0.095	2.135	1.690	0.0630.033	4.791	98.636	2.425			4.791	98.636	2.425
284	Subsoil	do	do		89.8950.3070.059	0.1650.731	0.220	2.360	3.090	0.1670.024	2.467	99.485	1.725			2.467	99.485	1.725
385	Light grayish-brown soil	Sec. 10, T. 5, R. 18 W	Conway	White, red, and black oaks sweet gum, black hickory, and walnut.	88.9150.1490.034	0.2410.658	0.245	2.840	2.310	0.1780.067	4.505	100.142	2.900			4.505	100.142	2.900
387	Subsoil	do	do		90.9400.1400.050	0.0930.306	0.220	2.365	3.985	0.1590.045	2.056	100.319	2.000			2.056	100.319	2.000
388	Bottom soil	Foot of Petit Jean mountain	Perry		94.5650.1430.048	0.4030.415	0.080	1.200	1.435	0.1910.086	1.747	100.293	1.250			1.747	100.293	1.250
390	Subsoil	do	do		93.5150.2060.038	0.2210.633	0.120	1.535	0.610	0.1790.041	2.050	99.148	2.050			2.050	99.148	2.050
424	Soil	Sec. 19, T. 5 S., R. 7 W	Jefferson		85.5450.5020.111	1.2570.928	0.295	1.940	1.410	0.3010.110	0.988	99.956	3.325			6.568	99.956	3.325
425	Subsoil	do	do		85.7450.4410.107	0.1651.100	0.095	3.490	6.060	0.1930.041	2.384	99.821	3.550			2.384	99.821	3.550
426	Polished buckshot or stiff red soil	Sec. 9, T. 6 S., R. 7 W	do		71.9800.8980.149	0.7002.871	0.145	5.965	9.985	0.3510.050	7.379	100.543	7.850			7.379	100.543	7.850
427	Stiff red subsoil	do	do		71.1650.0130.175	0.7332.513	0.345	7.000	10.385	0.4370.067	5.511	99.334	8.350			5.511	99.334	8.350
428	Chocolate-colored and tenacious soil	Sec. 20, T. 5 S., R. 7 W	do	Black elm, ash, oak, and hickory	70.2400.3410.125	0.5592.577	0.195	6.815	11.360	0.3280.135	7.879	101.154	8.435			7.879	101.154	8.435
429	Cotton soil	do	do		78.9900.7100.147	0.6131.292	1.170	4.615	6.590	0.258	6.750	101.105	5.200			6.750	101.105	5.200
411	Buckshot soil	Sec. 16, T. 6 S., R. 6 W	Arkansas	Gum, hackberry, box-elder, etc	75.7400.6420.204	0.9412.301	0.310	5.750	5.410	0.2570.101	7.880	99.536	8.000			7.880	99.536	8.000
412	Underclay	Ravines at Arkansas Post	do		86.8150.2120.153	0.2630.876	0.170	3.515	5.335	0.1300.041	2.470	99.980	4.250			2.470	99.980	4.250
414	Sandy bottom cotton soil	T. 7, R. 4 W	do		93.4150.2010.100	0.2150.737	0.170	1.740	2.135	0.1270.050	1.803	100.740	1.550			1.803	100.740	1.550
416	Subsoil	do	do		81.2400.7140.080	0.5431.555	0.245	4.640	6.065	0.2210.054	5.091	100.498	4.925			5.091	100.498	4.925
333	Light brown soil	Moton's plantation	do		78.3650.3570.083	0.8230.845	0.165	9.600	0.2500.067	9.342	99.892	5.375			9.342	99.892	5.375	
3. White river bottoms.																		
244	Soil	Oil-trough bottom	Independence	Pine, red and water oaks, elm, pecan, black walnut, sweet gum, hackberry, and buckeye.	79.9700.5650.202	0.5150.504	0.220	3.355	5.330	0.2320.042	8.872	99.897	4.475			8.872	99.897	4.475

246	Subsoil	do	do	83.730 0.440 0.150	0.362 0.614	1.495	3.310	5.200 0.222 0.042	5.516 101.180	3.025
379	White river bottom soil	Near hills, 1 mile above Batesville	do	80.265 0.406 0.111	0.083 0.539	0.096	3.140	5.610 0.372 0.110	8.242	99.569 6.275
381	Subsoil	do	do	83.875 0.376 0.095	0.380 0.521	0.190	4.350	4.400 0.298 0.058	4.421	99.133 4.450
382	Gray soil	Near river bank, 1 mile above Batesville	do	87.215 0.327 0.088	1.439 0.607	0.180	2.490	2.310 0.193 0.072	1.131	3.488 99.595 2.400
384	Subsoil	do	do	91.590 0.207 0.104	0.193 0.356	0.115	2.115	2.810 0.209 0.050	1.914	99.668 2.075
324	Soil of Black river bottom	Near Parquet bluff	do	84.080 0.145 0.156	0.198 0.250	1.270	6.140	3.615 0.282 0.066	3.353	99.555 4.565
436	Backshot soil	Sec. 6, T. 3 S., R. 5 E.	Phillips	67.542 0.493 0.108	1.332 1.721	0.200	5.455	6.802 0.303 0.165	1.046	14.390 99.537 11.235
438	Subsoil	Near No. 436	do	73.220 0.777 0.244	0.919 1.703	0.220	6.840	9.600 0.314 0.084	0.701	5.578 100.200 9.475
439	Sandy loam soil	High (sugar tree) ridge on Long Lake, Sec. 6, T. 3 S., R. 5 E.	do	84.840 0.347 0.108	0.590 2.057	0.220	2.965	3.870 0.297 0.075	0.465	5.555 101.369 4.150
441	Subsoil of No. 439	do	do	90.400 0.304 0.156	0.473 0.746	0.220	2.710	3.385 0.259 0.050	0.372	1.689 100.764 2.325
231	Black sandy soil	Cache river bottom	Jackson	88.620 0.306 0.085	0.283 0.408	0.320	1.865	2.725 0.294 0.083	4.759	99.628 2.875
233	Subsoil of No. 231	do	do	91.630 0.295 0.088	0.163 0.425	0.145	2.065	2.190 0.192 0.045	1.983	99.103 1.700
243	Soil	Cache river swamp	Poinsett	90.595 0.108 0.105	0.101 0.333	0.095	3.290	2.265 0.104 0.042	2.878	100.916 1.000
337	Red stiff soil	Edge of Lost Prairie, but in timbered land	Miller	74.740 0.657 0.191	2.542 2.839	0.140	4.990	5.590 0.182 0.084	1.998	6.587 100.540 5.125
339	Subsoil of No. 357, lighter colored	do	do	79.415 0.326 0.155	2.245 2.209	0.115	4.715	4.840 0.162 0.041	1.767	3.289 99.482 3.475
354	Black sandy soil	T. 14, R. 23	do	93.990 0.214 0.053	0.120 0.463	0.115	1.340	1.285 0.176 0.062	2.309	100.127 1.475
356	Subsoil of No. 354	do	do	93.990 0.164 0.062	0.064 0.656	0.065	1.540	1.640 0.126 0.058	1.822	100.187 1.225
329	Black sandy prairie soil	Near Lanesport	Sevier	84.540 0.417 0.077	0.669 0.691	0.155	2.090	3.310 0.190 0.084	0.526	6.627 99.312 3.875
391	Subsoil	do	do	89.040 0.337 0.088	0.185 0.524	0.165	2.340	2.710 0.266 0.062	3.631	99.453 7.750
322	Red cotton-land soil	do	do	78.290 0.670 0.132	2.682 0.685	0.265	10.940	0.163 0.067 2.108	4.616	100.627 4.150
378	Onachita river bottom soil	Sec. 30, T. 12, R. 18	Onachita	80.640 0.207 0.078	0.067 0.519	0.395	3.415	0.085 0.282 0.075	8.232	99.995 4.050
335	Dark second bottom soil	Sec. 16, T. 1 S., R. 15 W.	Saline	85.940 0.309 0.076	0.246 0.817	0.240	2.490	3.555 0.163 0.124	5.460	99.400 3.850
337	Dark subsoil of No. 335	do	do	89.990 0.212 0.073	0.092 0.462	0.270	5.295	1.185 0.182 0.058	2.451	100.240 2.100
220	Gray sandy soil	CROWLEY'S RIDGE REGION.	Greene	90.695 0.183 0.067	0.165 0.325	0.245	1.660	1.745 0.259 0.028	4.000	99.378 1.725
222	Subsoil of No. 220	do	do	91.870 0.207 0.065	0.152 0.412	0.195	1.960	1.170 0.117 0.041	2.329	98.518 1.275
223	Oak and pine ridge soil	Four miles south of Gainville	do	90.934 0.147 0.061	0.129 0.205	0.171	1.610	1.015 0.112 0.050	5.464	99.898 2.365
225	Light soil	do	do	89.220 0.102 0.049	0.241 0.490	0.281	1.650	2.565 0.111 0.050	5.080	99.899 2.365
227	Subsoil of No. 225	do	do	89.595 0.304 0.100	0.054 0.537	0.321	2.085	3.340 0.341 0.041	2.301	99.019 1.815
445	Hill land soil	Southern termination of Crowley's ridge	Phillips	90.790 0.245 0.117	0.185 0.618	0.425	1.950	2.735 0.242 0.050	3.148	100.506 2.175
447	Gray subsoil of No. 445	do	do	91.790 0.183 0.012	0.249 0.357	0.290	2.290	3.360 0.193 0.080	1.719	100.528 2.000
442	Table-land soil	Sec. 5, T. 2 S., R. 4 E.	do	88.450 0.220 0.094	0.333 0.350	0.395	1.640	2.970 0.444 0.079	5.300	100.194 3.425
417	Prairie soil	Mamelle prairie, edge of sunk land	Craighead	89.465 0.256 0.316	0.193 0.504	0.270	2.370	2.110 0.151 0.062	3.778	99.475 2.725
433	Little Prairie soil	do	do	88.490 0.217 0.069	0.109 1.263	0.245	2.465	3.435 0.165 0.075	3.748	100.281 3.800
434	Subsoil of No. 433	Near Moreau post-office	Lee	88.305 0.290 0.075	trace 0.504	0.195	2.790	4.885 0.129 0.060	2.374	99.697 3.125
435	Red underclay	do	do	76.495 0.338 0.159	0.081 2.835	0.170	5.315	9.820 0.251 0.099	4.296	99.314 5.750



## COTTON PRODUCTION IN ARKANSAS.

Analyses of soils and subsoils (air-dried) made by Dr. Robert Peter—Continued.

Number.	Description.	Locality.	County.	Vegetation.	Insoluble matter.	Potash.	Soda.	lime.	Alumina.	Phosphoric acid.	Sulphuric acid.	Carbonic acid.	Water and organic matter.	Total.	Hygrosopic moisture (air-dried).
<b>CHOWLEY'S RIDGE REGION—continued.</b>															
430	Gray soil	Sec. 11, T. 2 N., R. 1 E	do	White, red and post oaks, hickory, dogwood, black and sweet gum, and safras.	88.415 0.380 0.004	0.125 0.831	0.245	1.965	3.097 0.221	.....	.....	.....	2.463	99.722	2.550
297	Soil	Sec. 25, T. 1 N., R. 3 W	Monroe	Sweet gum, dogwood, and elm, some hickory and oak.	82.970 0.143 0.002	0.081 0.256	0.170	1.100	2.740 0.600 0.045	.....	.....	.....	2.103	100.820	1.525
449	Light soil	Governor Izard's land, west side of Chowley's ridge.	Saint Francis	Sweet gum, hickory, poplar, walnut, dogwood, red-bud, black ash, elm, muscadine and other grape-vines.	83.390 0.246 0.002	0.753 0.494	0.370	2.125	3.835 0.535 0.084	.....	.....	.....	8.555	100.429	5.325
224	Light sandy soil	Two miles north of Jacksonport	Jackson	Black and white oak, some hickory, and sweet gum.	94.045 0.140 0.042	0.190 0.308	0.220	1.190	1.940 0.004 0.033	.....	.....	.....	1.706	99.917	1.175
237	Sandy soil	Sec. 32, T. 14, R. 2 W	do	Black and some white oaks, hickory, and sweet gum.	83.965 0.120	.....	0.138 0.065	0.070	1.365	0.890 0.110 0.022	.....	.....	1.903	99.368	0.925
<b>GRAY SILT PRAIRIES.</b>															
321	Light soil	Grand prairie, 7 miles east of Brownsville.	Prairie	.....	90.020 0.053 0.035	0.026 0.289	0.293	1.635	1.725 0.146 0.053	.....	.....	.....	4.653	98.953	3.300
322	Subsoil of No. 720	do	do	.....	92.330 0.227 0.026	0.026 0.263	0.197	2.015	1.515 0.128 0.041	.....	.....	.....	2.138	98.806	1.825
406	Light prairie soil	Adjoining Spanish grant, Sec. 18, T. 7 S., R. 3 W.	Arkansas	.....	88.465 0.183 0.050	0.653 0.482	0.245	2.740	2.535 0.212 0.071	.....	.....	.....	4.094	99.130	3.690
408	Subsoil of No. 406	do	do	.....	86.400 0.169 0.044	0.053 0.536	0.345	3.965	4.910 0.118 0.067	.....	.....	.....	3.506	100.163	3.750
409	Soil	From highest of prairies on Sec. 17, T. 7 S., R. 3 W.	do	.....	88.865 0.103 0.072	0.081 0.475	0.220	2.140	2.600 0.163 0.101	.....	.....	.....	4.908	99.878	3.950
410	Upland woodland soil	Adjoining the prairie land of the Spanish grant, T. 7 N., R. 4 W.	do	.....	87.965 0.174 0.053	0.067 0.519	0.200	3.015	3.695 0.173 0.067	.....	.....	.....	3.814	99.742	3.390
<b>YELLOW-LOAM REGION.</b>															
375	Red soil	Southern part of county	Dorsey	.....	69.690 0.328	.....	0.225 0.413	0.745 15.939	5.985 0.331 0.075	.....	.....	.....	0.800	100.567	4.500
348	Sandy soil	Near Lisbon	Union	.....	95.890 0.029 0.095	0.012 0.301	0.140	0.965	0.285 0.052 0.027	.....	.....	.....	1.893	99.689	0.950
350	Subsoil of No. 348	do	do	.....	92.115 0.096 0.026	0.039 0.893	0.165	1.865	2.595 0.062 0.033	.....	.....	.....	1.074	99.903	1.425
340	Clay soil	Camp creek, near Lisbon.	Union	.....	90.715 0.025 0.036	0.078 0.208	trace	trace	3.735 0.096 0.062	.....	.....	.....	6.618	101.583	3.675
369	Sandy soil	2½ miles northwest of Warren	Bradley	.....	90.365 0.121 0.006	0.218 0.405	0.165	2.740	2.490 0.065 0.041	.....	.....	.....	3.207	99.853	2.085
<b>BLACK CRETACEOUS LANDS OF SOUTHWEST PRAIRIE REGION.</b>															
341	Black waxy soil	Sec. 19, T. 8, R. 19	Clark	Sweet gum, mulberry, and walnut.	68.315 0.563 0.111	1.478 1.737 0.370	0.350	12.910	0.302 0.075	1.102	8.216	101.589	11.650		
343	Cretaceous soil	Adjacent to a marl bluff on Decipher creek, Sec. 28, T. 7, R. 20.	do	Gum, hickory, oaks, and ash.	64.015 0.351 0.090	1.800 1.044	0.545	5.015	8.935 0.165 0.144	1.485	16.352	100.031	11.020		
326	Black soil	Sec. 7, T. 11, R. 25	Hempstead	Usually limited prairies, surrounded with pine, hickory, ash, and Osage orange.	77.740 0.314 0.015	1.352 1.142	0.290	4.235	8.255 0.191 0.067	1.062	5.387	100.031	4.875		
328	Subsoil	do	do	.....	35.140 0.314 0.095	28.124 1.313	0.240	2.535	5.235 0.087 0.080	22.106	5.583	100.878	4.800		
339	Cretaceous soil	Sec. 2, fractional T. 10, R. 30 W	Sevier	.....	73.115 0.432 0.125	1.088 0.490	0.251	3.780	9.627 0.262 0.077	0.832	9.213	99.612	7.475		
366	Black soil	Sec. 12, T. 12, R. 22	do	Hickory, scrub haw. and Osage orange	37.990 0.362 0.146	20.389 2.279	0.290	4.415	6.165 0.368 0.247	16.021	12.005	100.677	9.675		
368	Subsoil	Taken near the above	do	.....	10.915 0.135 0.089	44.385 0.702	0.140	1.615	2.740 0.112 0.118	24.875	4.579	100.415	2.775		
372	Pebbly soil	Sec. 4, T. 8, R. 26, on a branch of Bacon creek.	Pike	Chiefly white oak	85.915 0.155 0.035	0.360 0.562	0.295	1.495	2.735 0.165 0.092	.....	.....	.....	8.446	100.253	4.100
374	Pebbly subsoil	From near above place	do	.....	92.765 0.120 0.057	0.056 0.283	0.370	2.015	2.560 0.115 0.041	.....	.....	.....	1.775	100.157	1.425

RED LOAM (SHALE) UPLANDS.											
<i>Lands south of Arkansas river.</i>											
312	Sandy soil	8 miles north of Little Rock.	Pulaski	Black and post oaks, and some hickory.	93.445 0.058 0.045	0.030 0.219	0.145	2.130	1.275 0.063 0.027	2.763 100.269	2.275
314	Subsoil	do	do	do	90.910 0.093 0.081	0.018 0.253	0.096	2.265	3.455 0.063 0.033	2.354 99.621	1.665
363	Red soil	Sec. 33, T. 2 S., R. 30 W.	Polk	Red, black, white, and post oaks, dogwood, black walnut, wild cherry, pine, red elm, and hickory.	83.765 0.193 0.023	0.134 0.419	0.220	3.515	5.200 0.247 0.062	6.343 100.121	4.225
365	Subsoil	do	do	do	84.990 0.328 0.069	0.081 0.372	0.395	3.600	6.110 0.194 0.058	3.322 99.809	2.925
360	Yellowish-brown soil	One mile north of Waldron	Scott	Red, black, white, and post oaks, black ash, elm, cherry, black walnut, and dogwood.	87.340 0.193 0.037	0.106 0.316	0.145	3.065	4.085 0.261 0.050	4.763 100.361	3.225
362	Gray subsoil	do	Scott	do	86.215 0.227 0.065	0.106 0.359	0.195	4.750	5.855 0.128 0.042	2.873 100.545	2.475
391	Brownish gray soil	Sec. 18, T. 6, R. 21 W.	Yell	do	90.365 0.149 0.021	0.108 0.695	0.125	1.740	2.165 0.161 0.058	4.556 100.143	3.325
393	Gray subsoil	do	do	do	90.840 0.162 0.072	0.024 0.339	0.115	2.940	3.190 0.208 0.033	1.956 99.879	1.600
394	Red ferruginous soil	Sec. 2, T. 7, R. 25	Logan	Beach, oak, hickory, and post oak, with sumac undergrowth.	92.240 0.166 0.065	0.112 0.546	0.100	1.715	1.240 0.208 0.058	3.254 99.704	1.675
396	Subsoil	do	do	do	91.415 0.200 0.058	0.069 0.314	0.190	3.190	1.940 0.148 0.023	2.034 99.496	1.675
RED LOAM PRAIRIES.											
351	Red sumac prairie soil	Hodge's prairie, Sec. 12, T. 5, R. 31.	Sebastian	do	83.990 0.294 0.047	0.081 0.420	0.175	4.590	1.235 0.175 0.058	3.675 99.740	2.035
353	Reddish subsoil	do	do	do	83.240 0.214 0.059	0.073 0.308	0.165	6.940	4.510 0.208 0.050	4.247 100.015	2.300
<i>Lands north of Arkansas river.</i>											
318	Gray sandy soil	1½ mile east of Clarksville.	Johnson	Post, black, and black-jack, oaks, persimmon, and sumac.	90.545 0.092 0.024	0.025 0.259	0.145	3.050	1.910 0.174 0.033	3.316 99.573	2.000
320	Subsoil of No. 318	do	do	do	86.887 0.273 0.014	0.039 0.882	0.270	3.390	5.110 0.095 0.033	4.147 100.550	2.000
315	Gray sandy soil	6 miles north of Dover.	Pope	Post, black, red, and white oaks, and some hickory.	90.395 0.116 0.023	0.067 0.306	0.145	1.980	2.985 0.112 0.041	4.212 100.382	2.675
317	Subsoil	do	do	do	90.310 0.149 0.047	0.061 0.263	0.195	3.050	3.085 0.178 0.033	2.398 99.769	2.675
309	Brownish upland soil	1 mile from Van Buren.	Crawford	do	90.795 0.101 0.039	0.095 0.293	0.195	3.490	1.690 0.176 0.041	3.176 100.031	1.625
311	Subsoil	do	do	do	89.770 0.161 0.006	0.060 0.285	0.170	3.490	3.115 0.128 0.013	2.271 99.469	2.025
288	Reddish soil	T. 5, R. 14	Funkner	Black oak, hickory, and some white and black-jack oaks.	91.145 0.116 0.024	0.067 0.371	0.270	2.210	2.025 0.127 0.050	3.207 100.212	1.800
290	Subsoil	do	do	do	92.695 0.140 0.042	0.023 0.236	0.170	2.010	3.115 0.105 0.016	1.469 100.021	1.200
279	Reddish soil	Southeastern part of county.	Van Buren	Black and post oaks.	86.300 0.150 0.007	0.109 1.280	0.245	3.635	3.440 0.237 0.038	5.592 101.033	2.550
281	Subsoil	do	do	do	92.120 0.086 0.025	0.067 0.293	0.245	1.920	2.515 0.097 0.033	2.407 99.728	1.925
300	Red ferruginous soil	8 miles west of Searcy.	White	Black, red, and black-jack oaks, and hickory.	87.860 0.121 0.018	0.123 0.418	0.220	3.035	2.215 0.143 0.055	4.989 99.197	2.800
302	Subsoil	do	do	do	98.845 0.187 0.067	0.053 0.297	0.245	2.985	4.375 0.104 0.033	2.714 99.905	2.350
276	Red upland soil	Central part of county.	Washington	White and overcup oaks, hickory, black-berry, walnut, elm, ash, dogwood, and locust.	85.820 0.433 0.168	0.297 0.457	0.295	5.085	2.015 0.217 0.050	5.325 100.072	2.735
278	Red subsoil	do	do	do	88.795 0.111 0.025	0.189 0.392	0.495	3.185	1.545 0.118 0.050	4.571 99.476	2.100
<i>Granitic lands.</i>											
400	Light gray soil	Near the eastern slope of granite range of Purchase cove.	Pulaski	Red and white oaks, dogwood, hickory, and maple.	85.811 0.208 0.065	0.215 0.426	0.265	4.300	3.860 0.128 0.055	4.577 99.010	2.775
402	Brownish-gray subsoil	Taken near the above.	do	do	87.340 0.227 0.061	0.123 0.489	0.140	4.380	4.635 0.143 0.041	2.524 100.113	1.950
403	Micaceous underclay	do	do	do	90.515 0.347 0.384	0.123 1.206	0.140	7.650	21.365 0.180 0.045	8.325 100.350	5.675
NORTHERN BARRENS AND HILLS.											
<i>1. Barrens and magnesian limestone lands.</i>											
285	Sandy soil	Near Bentonville.	Benton	Black hickory.	92.320 0.125 0.025	0.053 0.364	0.145	2.000	0.940 0.078 0.024	2.818 98.792	1.550
287	Subsoil	do	do	do	92.195 0.193 0.037	0.036 0.976	0.170	2.560	1.100 0.040 0.016	1.494 98.897	1.225
306	Brush creek barrens soil	Northwest part of county.	Madison	Black-jack oak and hickory.	89.945 0.137	0.110 0.230	0.245	1.885	2.715 0.195 0.041	4.653 100.176	2.750

Analyses of soils and subsoils (air-dried) made by Dr. Robert Peteri—Continued.

Number.	Description.	Locality.	County.	Vegetation.	Insoluble matter.	Potash.	Soda.	Lime.	Magnesia.	Brown oxide of man- ganese.	Peroxide of iron.	Alumina.	Phosphoric acid.	Sulphuric acid.	Carbonic acid.	Water and organic matter.	Total.	Hygroscopic moisture (air-dried).
NORTHERN BARRENS AND HILLS—cont'd.																		
308	Brush creek barrens subsoil	Northwest part of county	Madison		91.8450 0.130 0.015			0.067 0.579	0.320	2.100	2.325 0.103 0.022					2.114	99.770	1.875
291	Light soil	Near Jasper	Newton	Black, white, red, and water oaks, black and sweet gums.	84.9450 0.137 0.054			0.418 0.313	0.445	2.110	2.080 0.131 0.050					7.722	98.415	4.500
293	Subsoil	do	do		90.8450 0.170 0.051			0.109 0.347	0.470	2.400	3.140 0.084 0.042					2.303	100.034	2.075
294	Soil	Near the mouth of Dry fork of Clear creek.	Searcy		92.005 0.104 0.007			0.330 0.184	0.105	1.320	1.140 0.078 0.042					2.933	99.094	2.000
296	Subsoil	do	do		89.445 0.150 0.057			0.112 0.361	0.470	2.410	3.475 0.151 0.033					2.919	99.586	2.425
240	Upland cherty soil.	Lot 25, T. 15, R. 8 W.	Izard	Post and white oaks, hickory, dogwood, and persimmon.	81.720 0.405 0.111			0.283 0.403	0.180	4.270	5.440 0.230 0.045					6.874	100.009	3.625
242	Brownish colored subsoil	do	do		85.080 0.372 0.105			0.137 0.561	0.130	4.485	4.790 0.103 0.042					3.343	99.298	2.050
303	Soil	2 miles west from Batesville	Independence	Hickory, oaks, etc.	88.920 0.205			0.137 0.292	0.345	1.985	3.325 0.102 0.045					4.204	99.020	2.075
305	Yellowish-brown subsoil	do	do		90.130 0.207 0.004			0.095 0.250	0.205	2.310	2.315 0.145 0.012					2.788	98.581	2.275
2. Cherty and siliceous lands.																		
264	Barrens soil	Sec. 31, T. 18, R. 17 W.	Fulton	A few scrub hickories, oaks, and wal- nuts.	79.420 0.686 0.061			0.380 0.341	0.220	4.110	5.165 0.104 0.084					7.575	98.206	3.875
266	Subsoil	do	do		77.345 0.700 0.101			0.243 0.803	0.370	5.360	7.240 0.165 0.050					6.341	98.787	4.200
261	Barrens soil	Sec. 23, T. 19, R. 14 W.	Baxter	Rosinwood and grass	76.205 0.603 0.583			0.364 0.815	0.295	3.810	5.015 0.147 0.084					11.011	99.112	4.650
263	Yellowish subsoil	do	do		83.220 0.430 0.117			0.196 0.526	0.205	3.350	3.790 0.102					6.139	98.219	2.825
255	Upland siliceous soil	From near waters of Big creek	Marion	Big-bud hickory, black-jack, and red oaks.	80.920 0.236 0.120			0.196 0.304	2.165		2.615 0.103 0.028					4.308	100.085	1.950
257	Subsoil	do	do		90.765 0.249 0.141			0.109 0.290	2.685		3.340 0.117 0.025					2.309	100.130	1.300
267	Siliceous soil of second uplands		Fulton	White oak and hickory	88.070 0.232 0.031			0.224 0.383	0.320	1.960	1.815 0.162 0.050					5.793	99.040	2.475
269	Subsoil	do	do		91.345 0.235 0.016			0.039 0.371	0.270	2.890	3.265 0.078 0.050					1.794	100.353	1.100
248	Upland siliceous soil	A few miles west of Powhatan	Lawrence	Black-jack and post oaks and small hickory.	92.830 0.154 0.064			0.100 0.337	0.130	0.570	2.115 0.095 0.028					2.979	99.388	1.325
250	Subsoil	do	do		91.270 0.228 0.115			0.109 0.245	5.800		0.078 0.022					1.979	100.047	1.050
270	Pine upland soil	1 mile from Calico	Izard	Black oak, hickory, and pine	91.845 0.156 0.055			0.039 0.285	0.070	1.500	2.065 0.104 0.024					2.673	99.606	1.465
272	Sandy subsoil	do	do		93.880 0.198 0.019			0.050 0.206	0.145	1.165	2.200 0.095 0.011					1.705	99.800	0.875
3. Prairies.																		
252	Soil	Sugar Loaf creek	Marion		82.520 0.301 0.152			0.153 0.473	2.465		5.215 0.230 0.067					7.729	100.205	4.265
254	Subsoil	do	do		88.960 0.294 0.084			0.168 0.317	2.865		3.340 0.137 0.038					2.524	99.737	1.950